FURUNO

Installation Manual
INMARSAT FLEETBROADBAND
FELCOM 250/FELCOM 500

FURUNO ELECTRIC CO., LTD.

www.furuno.com

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

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(DAMI) FELCOM500/250

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SAFETY INSTRUCTIONS

Read these safety instructions before you operate the equipment.

WARNING	Indicates a condition that can cause death or serious injury if not avoided.
CAUTION	Indicates a condition that can cause minor or moderate injury if not avoided.

Warning, Caution | Prohibitive Action | Mandatory Action

WARNING

Do not open the equipment unless totally familiar with electrical circuits and service manual.

Only qualified personnel should work inside the equipment.

Do not approach the radome closer than 1.4 m (FELCOM 500) or 0.7 m (FELCOM 250) when it is transmitting.

The radome emits radio waves which can be harmful to the human body, particularly the eyes.

RF power dendity on antenna aperture	FELCOM500 distance	FELCOM250 distance
100W/m ^{2}	-	-
25W/m ^{2}	0.5 m	0.4 m
10W/m ^{2}	1.4 m	0.7 m

Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.

Fire, electrical shock or serious injury can result if thepower is left on or is applied while the eqiuipment is being installed.

WARNING

Ground the equipment to prevent electrical shock and mutual interference.

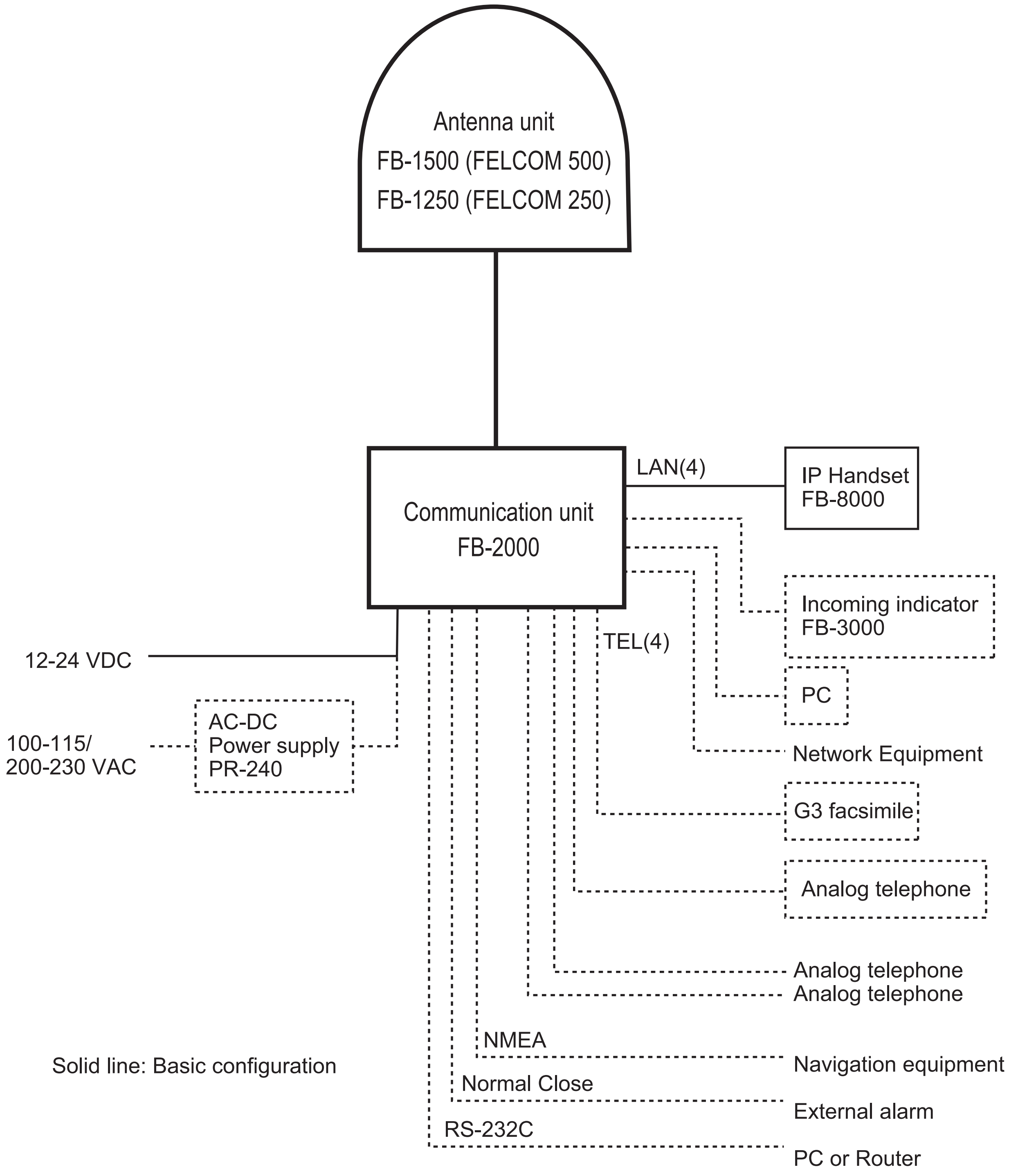
Confirm that the power supply voltage is compatible with the voltage rating of the equipment.

Connection to the wrong power supply can cause fire or damage the equipment.

Keep the following compass safe distances to prevent interference to a magnetic compass.

Unit	Standard compass	Steering compass
FELCOM 500 Antenna Unit	0.75m	0.40 m
FELCOM 250 Antenna Unit	0.70m	0.40 m
Communication Unit	0.40 m	0.30 m
IP Handset	0.70 m	0.45 m
Facsimile	1.30 m	0.80 m
Telephone	0.50 m	0.40 m
Incoming Indicator	0.45 m	0.30 m
AC-DC Power Supply	0.90 m	0.60 m

SYSTEM CONFIGURATION



Environmental Category

Antenna unit	To be installed in an exposed area
Communication unit, IP handset, etc.	To be installed in a protecded area

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
Antenna unit	FB-1500	-	1	For FELCOM 500
	FB-1250	-		For FELCOM 250
Communication unit	FB-2000	-	1	
IP handset	FB-8000	-	1	
Installation materials*	CP16-04100	000-015-746	1	30 m antenna cable
	CP16-04110	000-015-747		50 m antenna cable
	CP16-04120	000-015-865		40 m antenna cable
	CP16-04401	001-093-460	1	For FB-1500
	CP16-04501	001-093-480	1	For FB-1250
	CP16-03810	000-015-759	1	For FB-2000
	CP16-03901	001-067-350	1	For FB-8000
Accessories	FP16-02200	000-015-762	1	CD-ROM for FB-2000
Spare parts	SP16-01901	001-067-320	1	Fuses for FB-2000

*: See lists at the back of this manual.

Optional Supply

Name	Type	Code No.	Remarks
Incoming indicator	FB-3000	000-015-763	w/CP16-04001
Telephone	FC755D1	000-043-369	w/CP16-00511, 00512
Facsimile	FAX-2820	-	w/CP16-03500, 220VAC
Transformer	OP16-25	004-446-850	Transformer TSU-N05E +cable for FAX-2820
Drum unit	DR-20J	000-170-982-10	For FAX-2820
Toner cartridge	TN-25J	001-111-660-10	For FAX-2820
AC-DC power supply	PR-240	-	
IP handset	FB-8000	-	
Coaxial cable	12D-SFA-CV	000-136-423-11	100 m for antenna cable
Installation materials	CP16-04121	001-067-300	Connector N-SP-12DSFA-CF for cable 12D-SFA-CV
	CP16-04131	001-067-310	Connector N-P-18U-CF (2 pcs) for RG-18

Name	Type	Code No.	Remarks
Connector	CP03-28901	008-542-460	Modular connector MPS588-C2 pcs for LAN cable
LAN cable	MOD-Z072-020+	000-167-175-10	2 m, modular plug for both ends
	MOD-Z072-050+	000-167-176-10	5 m, modular plug for both ends
	MOD-Z072-100+	000-167-177-10	10 m, modular plug for both ends
	FR-FTPC-CY *10m*	000-147-472-10	10 m with armor, no plug
	FR-FTPC-CY *20m*	000-147-473-10	20 m with armor, no plug
	FR-FTPC-CY *30m*	000-147-474-10	30 m with armor, no plug
	FR-FTPC-CY *50m*	000-153-326-10	50 m with armor, no plug
	FR-FTPC-CY *100m*	000-153-327-10	100 m with armor, no plug
Modular jack set	OP16-13	000-043-228	MJ-2S, 3 m cord, lug
Modular jack box	OP16-8	000-043-272	MJ-2S, lug
Joint box	TL-CAT-012	000-167-140-10	Fro LAN cable extension
Cable assy.	81-521-1204-010	000-127-108-11	5 m cable w/ D-sub 9 pin connector at both ends
Incoming Indicator	KK-893-3977	000-148-478	For analog TEL.
Modular jack box	OP16-10	000-043-278	Box type
	OP16-11	000-043-279	Flush mount type
Pole mount kit	OP16-52	000-017-061	For FELCOM 250 antenna unit
Kit for RF interference	OP16-50	000-016-316	For FELCOM 500
Radiation sticker	OP16-53	001-115-470-10	For FELCOM 500

1. HOW TO INSTALL THE UNIT

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

1.1 Antenna Unit

General

Interfering objects (especially metal objects like masts) near the antenna can, in the worst case, prevent reception or transmission. Further, RF radiation from the antenna will affect the human body. Keep these and the following guidelines in mind when selecting a mounting location for the antenna unit.

Secure unobstructed path in all directions

The best mounting location secures an unobstructed path between the antenna unit and the satellites, from horizontal to zenith. In other words, whatever the direction the antenna unit is pointing there are no interfering objects within the main beam (22° for FELCOM 500, 40° for FELCOM 250). While this might be feasible on some vessels, on others it is impossible due to space considerations. The antenna unit should be located at least three meters away from masts having a diameter less than 15 centimeters.

Select a location low in vibration

The maximum permissible vibration amplitude in three axis direction should be as shown in the table below. Consult with the shipyard to determine the mounting location which meets the requirements shown in the table.

Freq. Range	Max. Amplitude
4 to 10 Hz	2.54 mm (max. 9.8 m/s^2)
10 to 15 Hz	0.76 mm (max. 6.86 m/s^2)
15 to 25 Hz	0.40 mm (max. 9.8 m/s^2)
25 to 33 Hz	0.23 mm (max. 9.8 m/s^2)

Locate away from passengers and crew

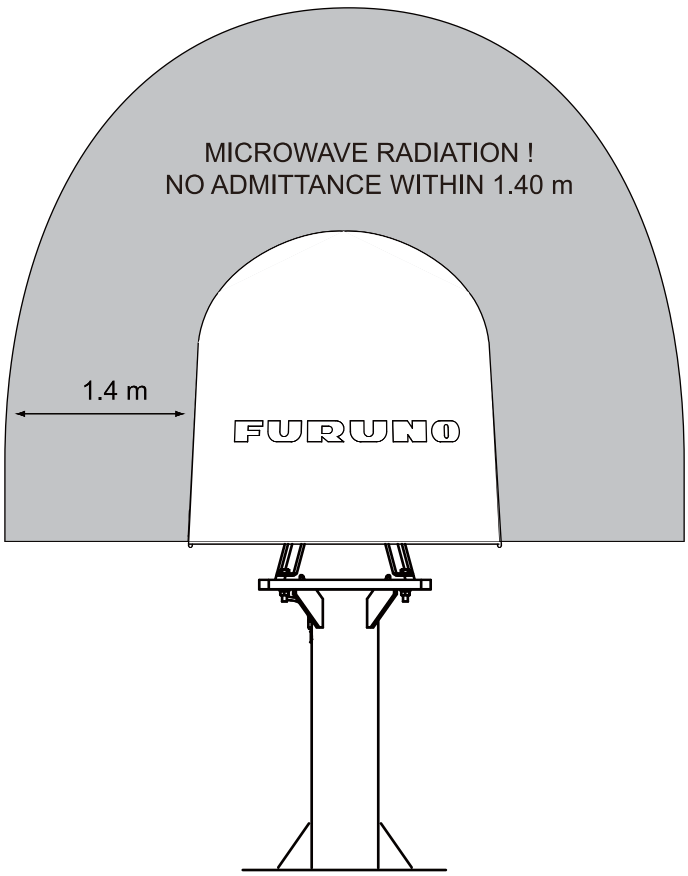
Radio waves can be harmful to the human body. Because safe distances change by country and ship construction, there is no standard formula to calculate safe distance. However, below are general guidelines.

- FELCOM 500: Personnel should not approach an area in which the radiation level is higher than 10 W/m2, i.e., within 1.40 m from the radome surface.

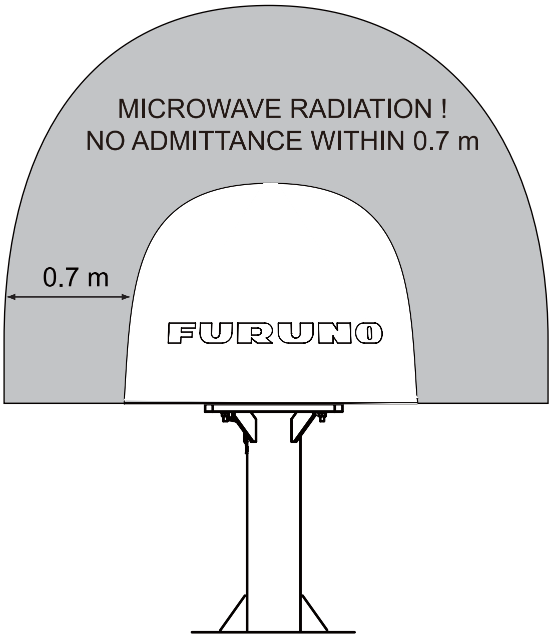
⚠ WARNING

Do not approatch within 1.40 m of the antenna radome when it is transmiting. Microwave radiation can be harmful to the human body, particularly the eyes.

Construct a protective fence around the antenna unit so that personnel can not approach the antenna unit within 1.40 m. Also, to alert personnel not to approach the antenna unit, attach the caution labels (supplied as installation materials) to any bulkhead which is at the position of 1.40 m from the antenna unit.



- FELCOM 250: Personnel should not approach an area in which the radiation level is higher than 10 W/m2, i.e., within 0.70 m from the radome surface.



Construct a protective fence around the antenna unit so that personnel can not approach the antenna unit within 0.70 m. Also, to alert personnel not to approach the antenna unit, attach the radiation warning sticker (supplied as installation materials) to any bulkhead which is at the position of 0.70 m from the antenna unit.

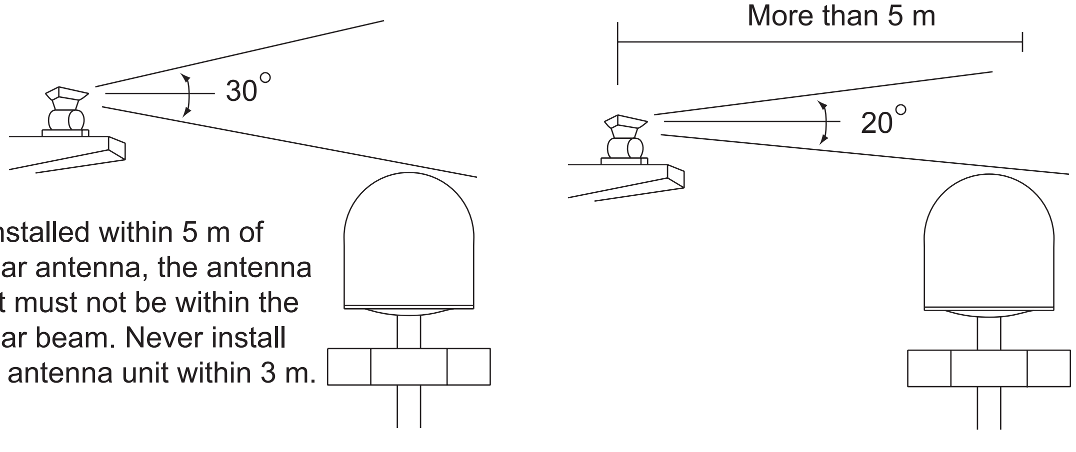
Minimum distance from other antennas

MF/HF antennas, communication/navigation antennas:

The antenna unit should be at least five meters from a MF/HF antenna. The VHF, satellite navigation antenna and other communication antennas should be at least four meters away.

Radar:

The antenna unit should be at least 5 meters away to protect the low-noise amplifier in the FELCOM 500/FELCOM 250 antenna unit. If this distance cannot be secured be sure the antenna unit is not within the radar beam. However, never install the antenna unit within 3 m of a radar antenna.



Distance from radar antenna

Compass safe distance

Locating the antenna unit too close to a compass can affect the compass performance. Keep the compass safe distance to prevent interference to the magnetic compass. See page i.

Other mounting guidelines

Other important mounting guidelines are

- Locate the antenna unit away from exhaust stacks (foreign material on the radome can interfere with reception and transmission).
- Keep the unit away from heat sources.
- Locate the unit away from places where fuels and chemical solvents are stored.
- Keep in mind the length of the cable from the communication unit is maximum 100 meters (when coaxial cable 12D-SFA-CV is used).

Guardrail, platform

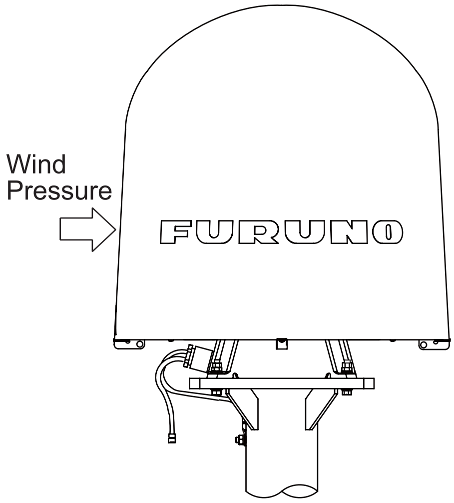
To facilitate servicing, construct a mast of about one meter (40") in height. (See page 5.) The paragraphs which follow provide guidelines for selection and construction of the mast.

Fit the mast with a guardrail and platform (or steps), for serviceman's safety. (In most installations the serviceman stands on the platform while checking the radome. Thus this distance should be secured for ease of servicing.) The height of the guardrail should be as tall as possible to ensure safety.

Mast strength

The mast material must be sufficiently strong to meet the demands of the marine environment. It should satisfy the following requirements.

- It must be able to support radome mass plus at least 2.5 cm (1") of ice and snow. Special consideration should be given if the unit is operated in areas of heavy snow or freezing temperature.
- The mast bending moment must be able to withstand expected maximum pitching, rolling and wind pressure.
- To prevent resonance at low frequencies (approximately 5 Hz), four stays can be fixed between the mast and the mounting base.



(Above figure: FELCOM 500)

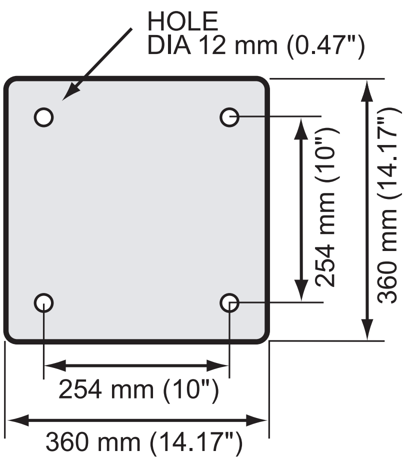
Item	FELCOM 500	FELCOM 250
Antenna unit mass	21 kg (46 lb) ± 10%	6.5 kg ± 10%
Platform, guardrail mass		
Expected ice and snow		
Maximum wind pressure (at wind speed 56 m/s)	280 N	36.3 N

Antenna mast and mounting base

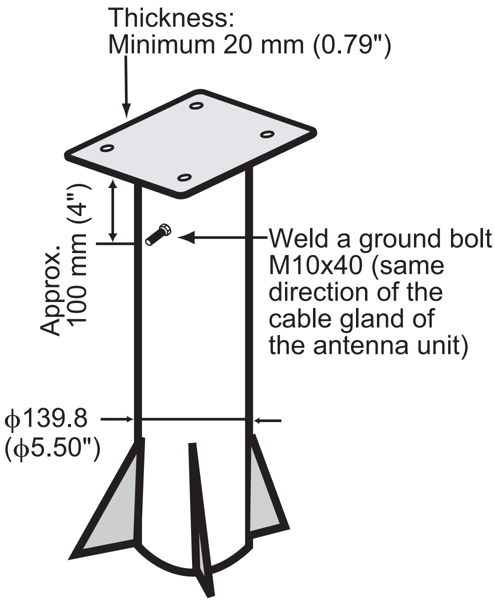
To get the best performance from the antenna electronics and mechanics, the antenna must be installed properly on a specially designed mast with suitable flange and rubber gasket. Below are guidelines for installation of the mounting mast and mounting base.

- The mounting base should be parallel to the ship's waterline (tolerance: ±3°).
- Weld a ground bolt of stainless steel to the mast (figure below). Connect the ground wire from the antenna unit to the ground bolt.

FELCOM 500

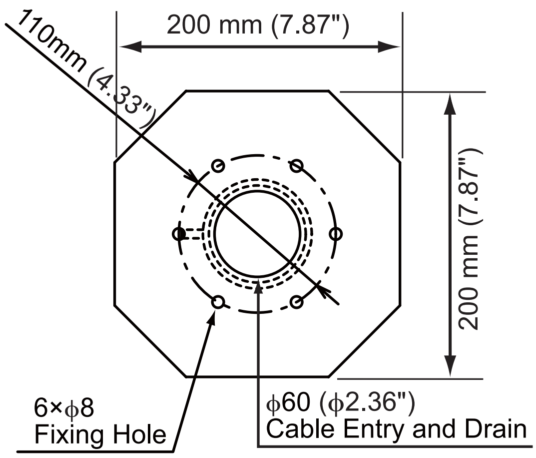


[Mounting base]

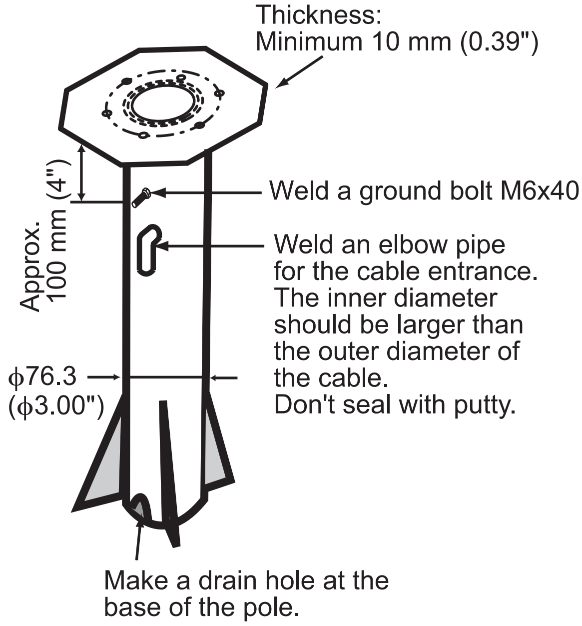


[Antenna mast: Example]

FELCOM 250



[Mounting base]



[Antenna pole: Example]

FELCOM 500: How to install the antenna unit

Carefully unpack the radome and check for damage.

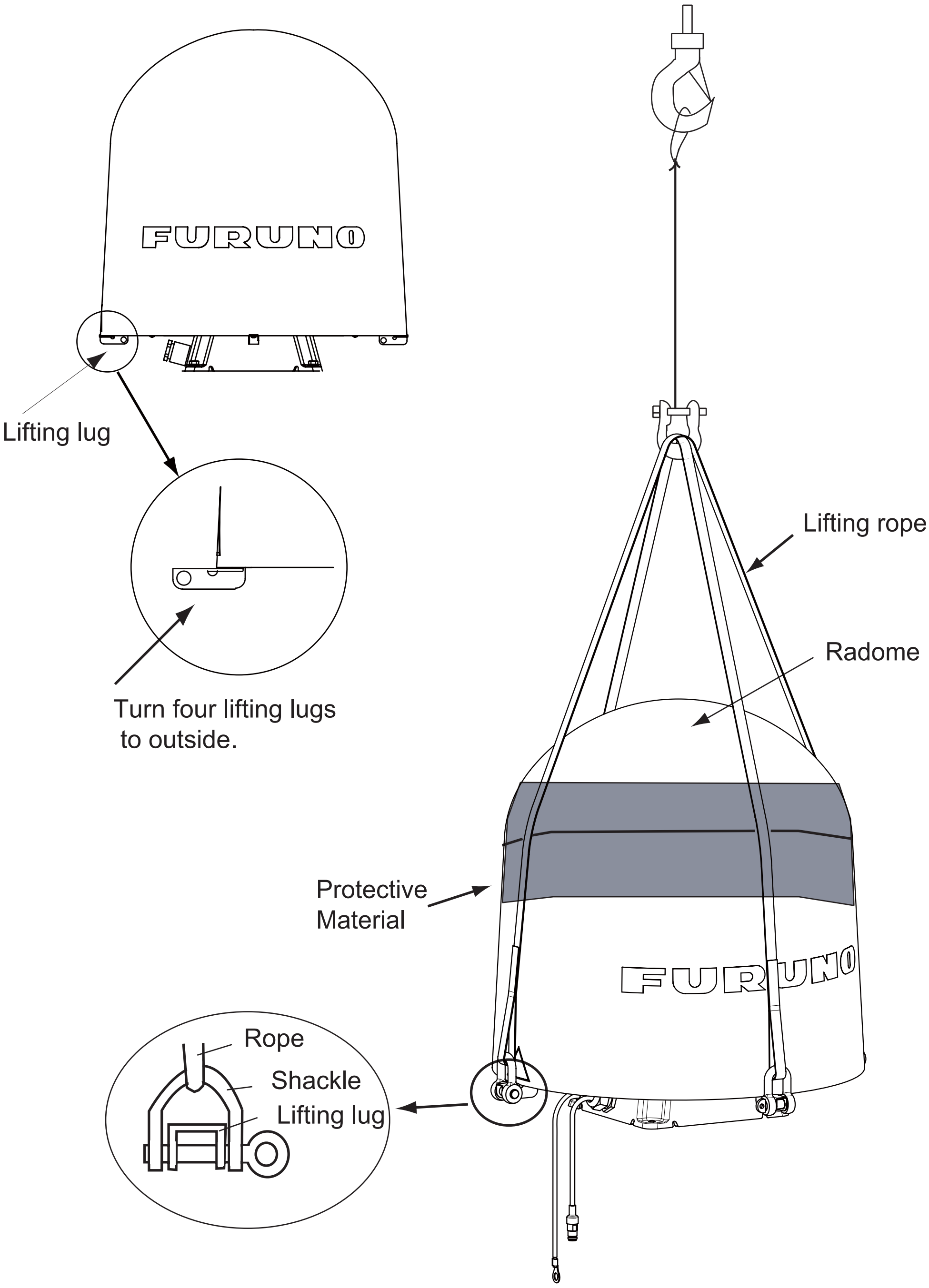
Antenna unit installation materials

Item	Quantity	Remarks
Silicone sealant	1	50 g
Rubber mat	1	
Radiation warning sticker	1	
Hex bolt	4	M10x60
Hex nut	8	M10
Spring washer	8	M10
Flat washer	8	M10
Seal washer	4	

Procedure

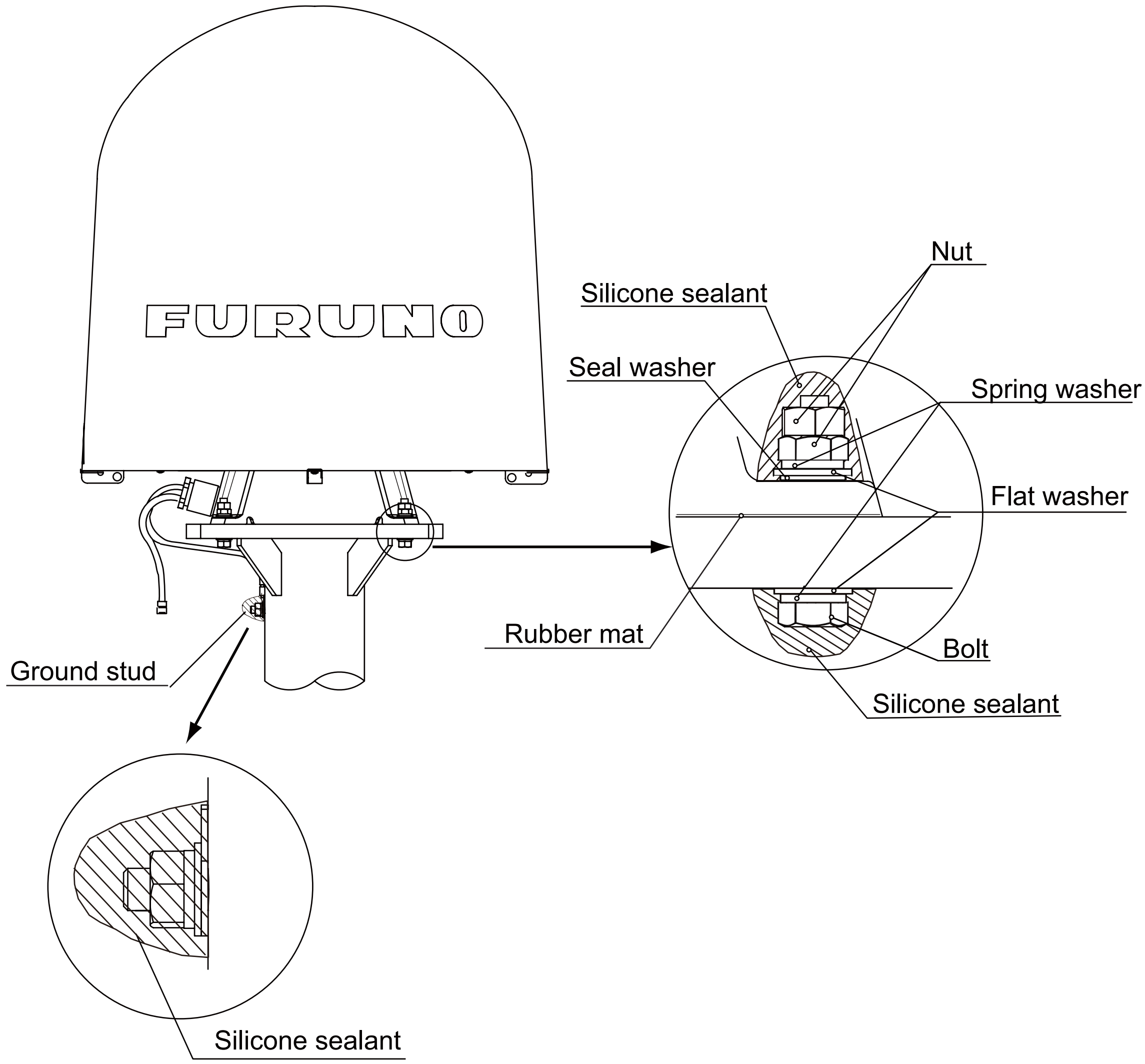
1. Loosen four lifting lugs and turn them to outside at the bottom of the radome as shown in the figure on the next page. Then fasten four screws for lifting lugs firmly.
2. Run lifting rope with shackles through lifting lugs.
3. Cover the part of the radome which contacts the lifting rope with protective material (rubber mat, etc.), to prevent damage to the radome when hoisting it to the mounting location.
4. Lift the antenna unit to the mounting location.

5. Lay the rubber mat on the mounting base and put the antenna unit on the rubber mat, keeping in mind cable gland direction (standard direction is stern).



6. Fix the antenna unit with four sets of hexagonal bolts and nuts as shown on the next page.
   Note: Tighten first nut with torque 36.5 Nm, then tighten second nut with the same torque.
7. Connect the ground wire to the ground bolt.
8. Coat all bolts and nuts with silicone sealant to prevent electrolytic corrosion.

9. Restore the lifting lugs to their original positions.



FELCOM 250: How to install the antenna unit

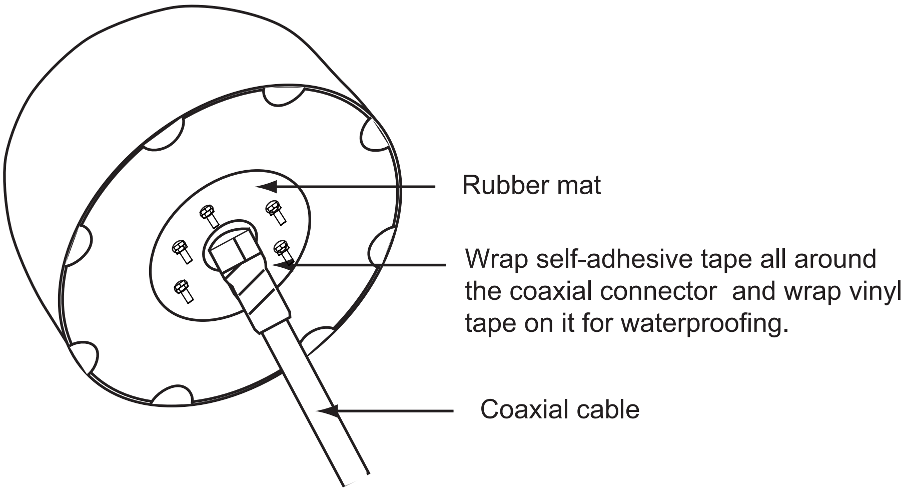
Carefully unpack the radome and check for damage. Run the antenna cable before installation of the antenna unit.

Antenna unit installation materials

Item	Quantity	Remarks
Silicone sealant	1	50 g
Rubber mat	1	This mat may be pre-attached to the antenna unit depending on the date of production.
Radiation warning sticker (S)	2	
Radiation warning sticker (L)	1	
Hex nut	12	M6
Spring washer	6	M6
Flat washer	6	M6
Ground wire	1	200 mm, W/6 mm crimp-on lug for both ends

Procedure

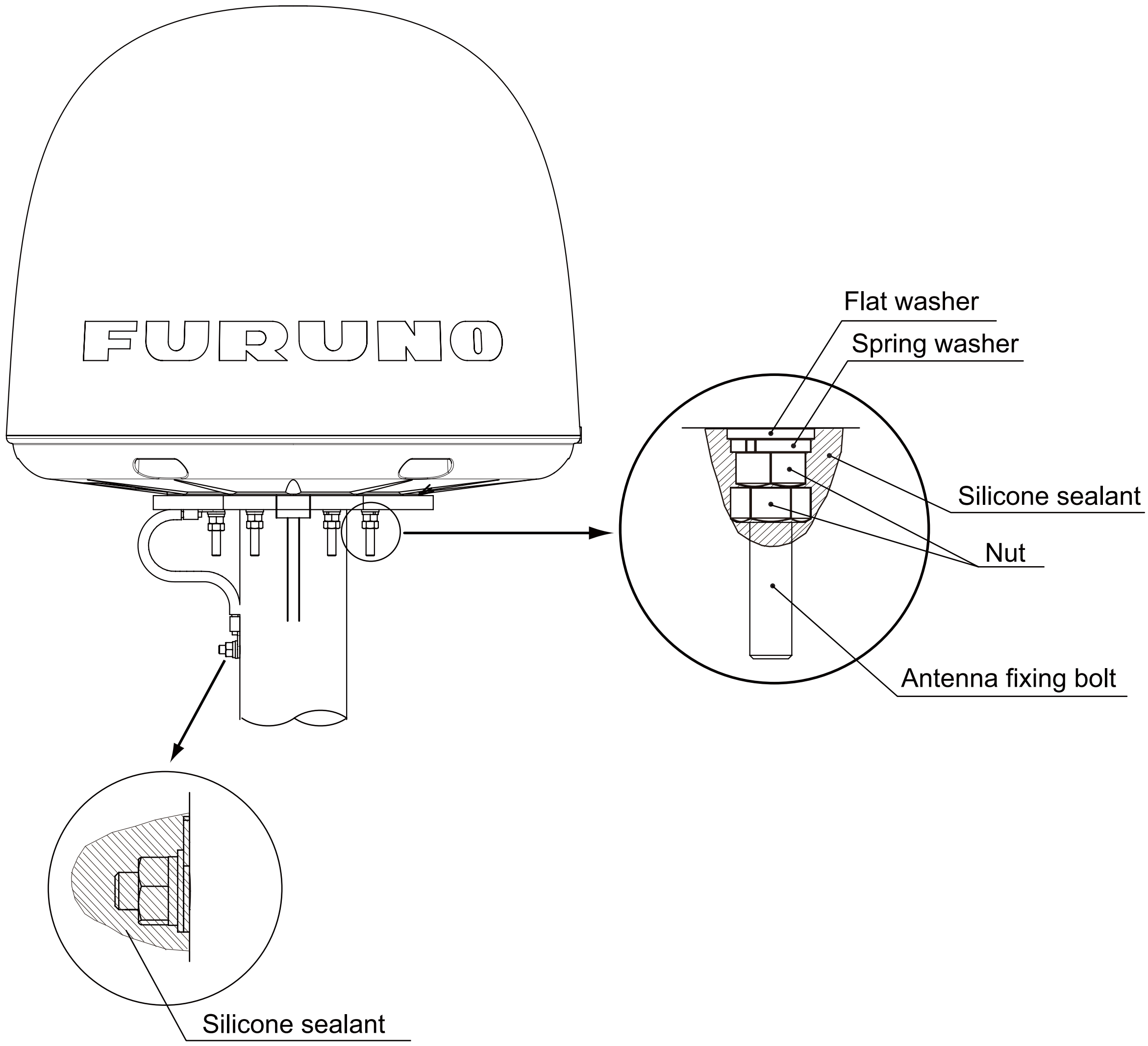
1. Attach the rubber mat on the bottom of the antenna unit if the mat is supplied as the installation material.
2. Connect the antenna cable to the coaxial plug on the bottom of the antenna unit.
3. Wrap the self-adhesive tape all around the coaxial connector for waterproofing and wrap the vinyl tape on the self-adhesive tape.



Antenna unit bottom

4. Put the antenna unit on the mounting base.
   The antenna unit is free of direction. However, preferably install the antenna unit, so the FURUNO logos face the port/ starboard side.
5. Fasten the ground wire (supplied) to the antenna bolt near the ground stud on the antenna mast and secure with hexagonal nut, spring washer and flat washer.
6. Secure other antenna bolts with a set of hexagonal nuts, spring washers and flat washers as shown below on the next page.
   Note: To fix the antenna bolt, tighten first nut with torque 7.65 Nm and then tighten the second nut with the same torque.
7. Connect the ground wire to the ground stud on the antenna mast.
8. Attach the radiation warning sticker (small) to the bow and stern sides of the antenna radome. If these locations are not suitable, attach the radiation warning stciker (big) to the ship's body near the antenna radome.

9. Coat all bolts and nuts with silicone sealant to prevent electrolytic corrosion as shown below.

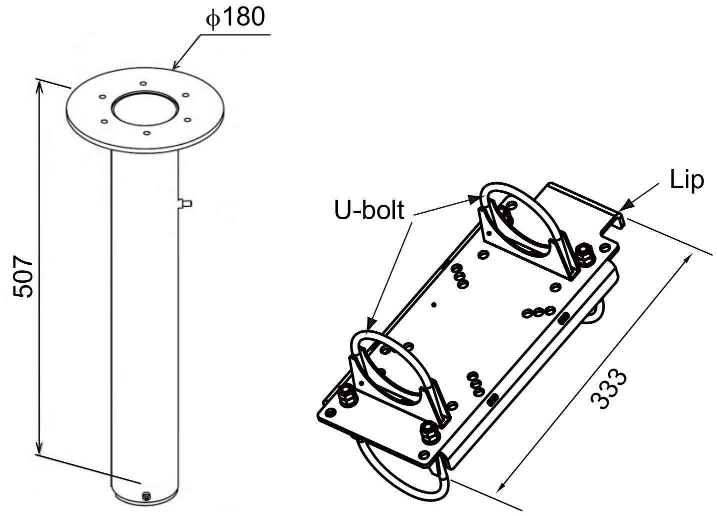


Note: The cable entry hole (ϕ60) at the bottom of the antenna functions as ventilation hole, allowing trapped moisture to escape the dome. For that reason, ensure the hole is not blocked.

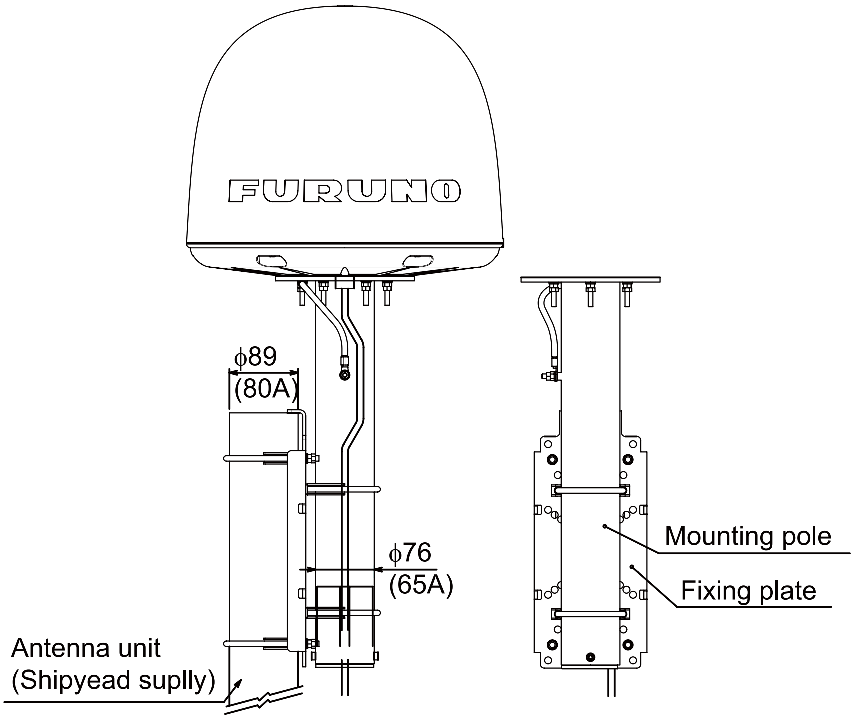
How to mount the FELCOM 250 antenna unit with optional pole mount kit

Pole mount kit: Type OP16-52, Code number 000-017-061

Name	Type	Code no.	Qty
Mounting pole	SP-SAC-1031	000-173-963-10	1
Fixing plate	SP-SAC-1032	000-173-964-10	1



1. Ask the shipyard to prepare and mount an antenna mast (diameter ϕ89: 80A).
2. Attach the fixing plate SP-SAC-1032 to the antenna mast by hanging the lip of the fixing plate on the top of the antenna mast.
3. Insert the mounting pole SP-SAC-1031 through the U-bolts of the fixing plate and fasten the U-bolts.
4. Put the FELCOM 250 antenna unit on the mounting pole and fix it with nuts (see previous page).



1.2 Communication Unit

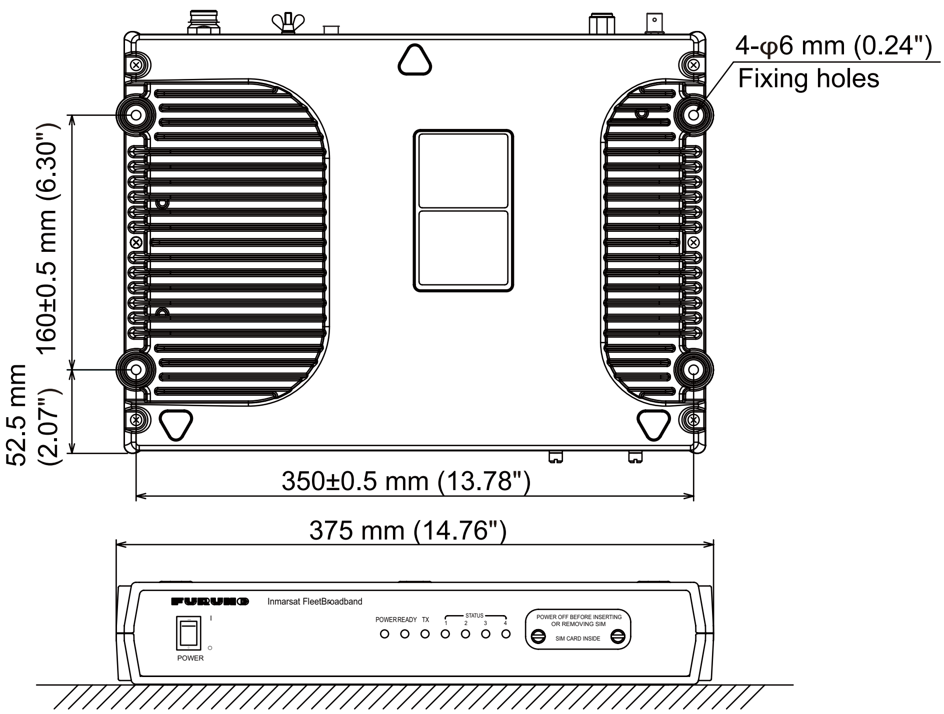
Select a location for the communication unit (CU) by following the information shown below.

- The unit is not waterproof. Keep the unit away from water splash.
- Keep the unit away from direct sunlight.
- The temperature and humidity must meet the requirements shown in the equipment specifications.
- Set the unit away from the exhaust pipes and vents.
- The installation location must have enough cool air.
- Install the unit where shock and vibration meet the requirements shown in the equipment specifications.
- Keep the unit away from the equipment that creates an electromagnetic field, for example, motor and generator.
- For maintenance and checking, leave enough space at the sides and rear of the unit. Refer to the outline drawing and provide some additional length in cables.
- Follow the recommended compass safe distances shown on page i to prevent the interference to a magnetic compass.

How to install the CU

Follow the procedure shown below to install the CU on a desktop. See the outline drawing on page D-3 for details.

1. Place the template (supplied) of the CU on the installation site.
2. Mark the points for four pilot holes and makes the pilot holes for 5x50 self-tapping screws.
3. Put the unit on the installation site and fix it with four 5x50 self-tapping screws (supplied).

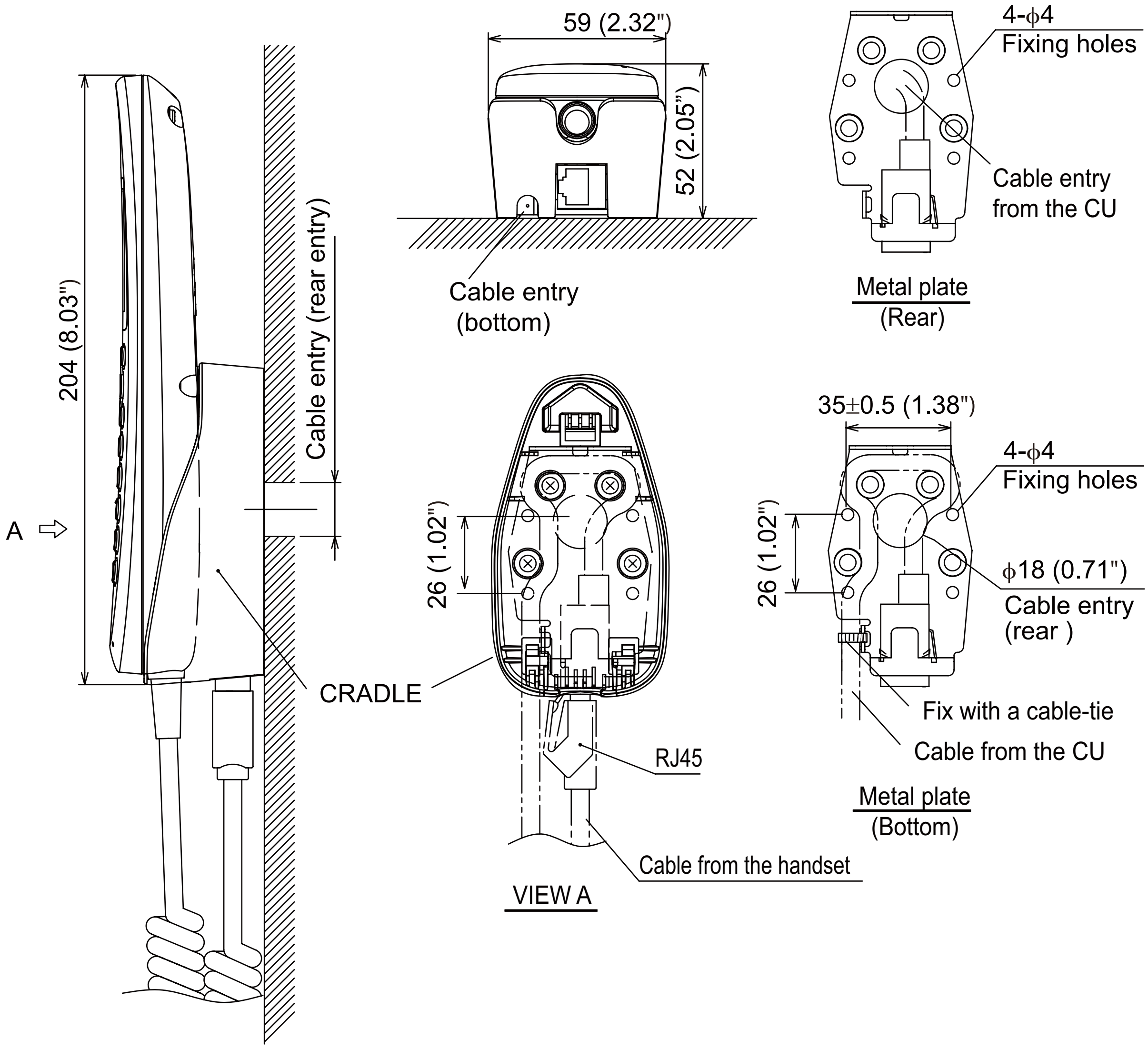


Note: It is necessary to install the Communication Unit on a desktop to comply with IPX2 (dripping) standard. Refer to section 2.5 for directions to how to install on a desktop.

1.3 IP Handset

The IP handset functions as a display and it may also be used for normal voice communication. The units (max 26 units) may be installed anywhere onboard the vessel. The IP handset is provided with a cradle. Fix the cradle to the bulkhead or installation panel. The cradle has two cable entries for convenience; bottom and rear.

1. To use the rear cable entry, make a hole of 18 mm (0.71") diameter in the installation site, Refer to the outline drawing.
2. Remove four screws from the cradle to separate the plastic case from the metal plate.
3. Fix the metal plate to the mounting site with four self-tapping screws.
4. Connect the LAN cable from the CU to the inner RJ45 port in the cradle.
5. If the bottom cable entry is used, run the LAN cable as shown in the figure below and fix it with a cable-tie.
6. Reattach the plastic cover.
7. Connect the cable from the handset to the outer RJ-45 port of the cradle.



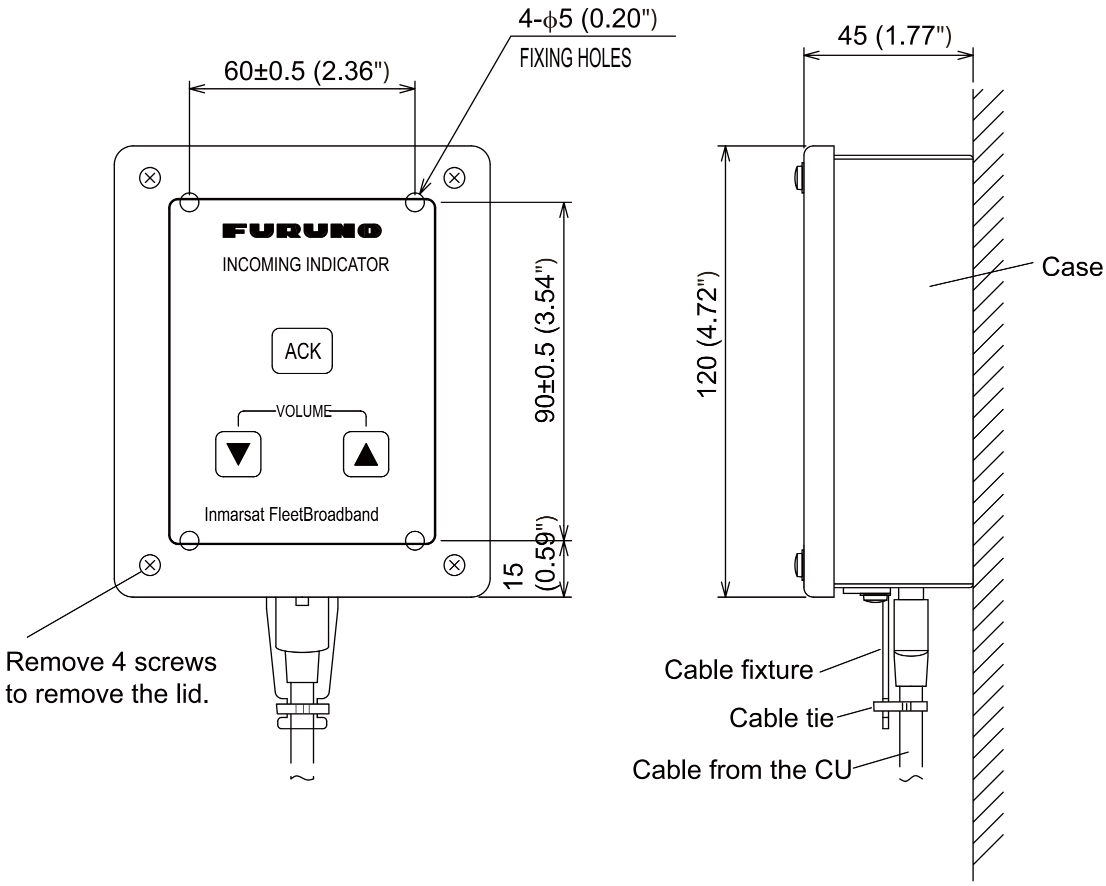
1.4 Incoming Indicator (option)

Select a location for the incoming indicator by following the information shown below.

- Keep the unit away from water splash.
- Keep the unit away from direct sunlight.
- Set the unit away from the exhaust pipes and vents.
- Follow the recommended compass safe distances shown on page i to prevent the interference to a magnetic compass.

How to install on the bulkhead or bridge panel

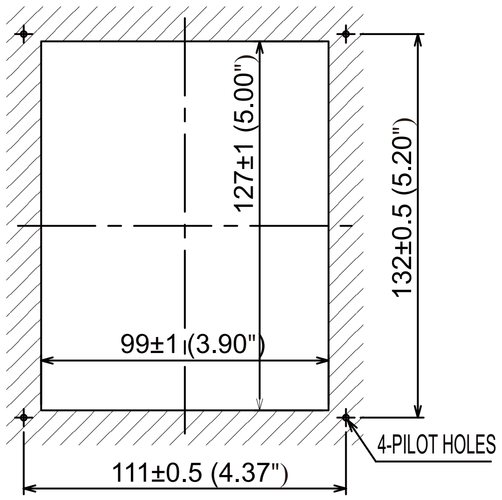
1. Remove four screws from the unit to remove the lid.
2. Fix the case with four 4x16 self-tapping screws (supplied).
3. Reattach the lid with four screws.
4. Connect the cable from the CU.
5. Attach the cable fixture (supplied) with two screws.
6. Fasten the cable to the cable fixture with the cable tie (supplied).



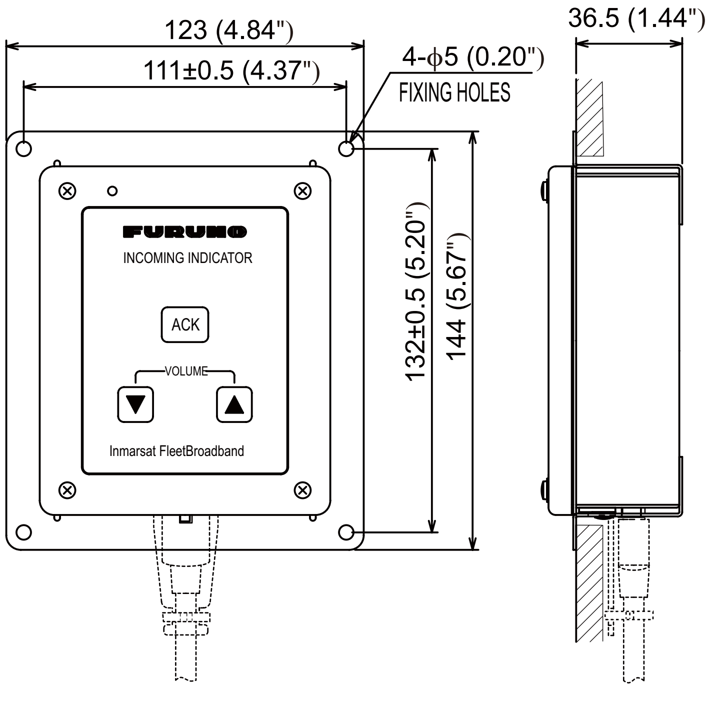
How to install by the flush mount

1. Prepare a cutout in the installation location and make four pilot holes. Refer to the outline drawings.
2. Set the flush mount plate (supplied) to the cutout and fix it with four 4x16 self-tapping screws (supplied).
3. Remove four screws from the unit to remove the lid.

4. Fix the case with four M4x8 screws (supplied) to the flush mount plate.
5. Pass the cable from the CU through the bottom of the case.
6. Connect the cable to the port on the lid.
7. Attach the cable fixture (supplied) with two screws.
8. Fasten the cable to the cable fixture with the cable tie (supplied).
9. Reattach the lid to the case with four screws.

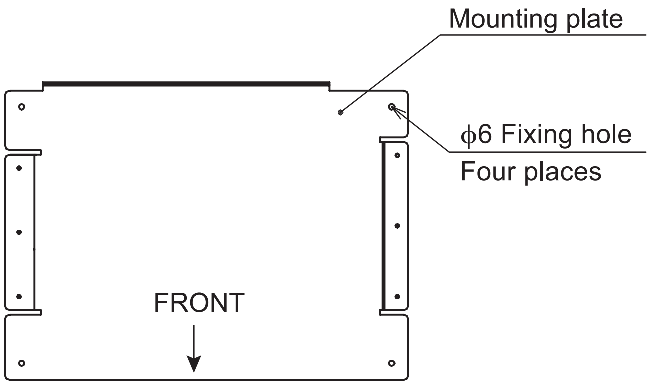


CUTOUT DIMENSIONS

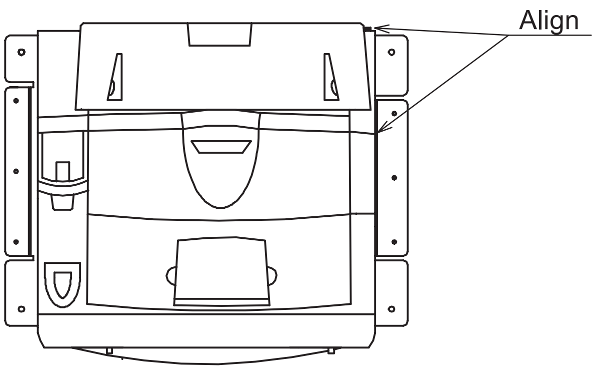


1.5 Facsimile FAX-2820 (Option)

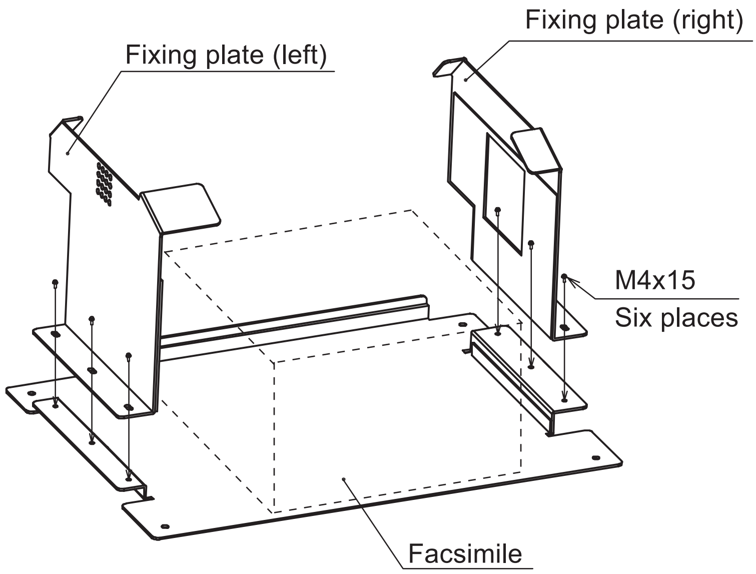
Note: The hooks supplied are not used in the installation.



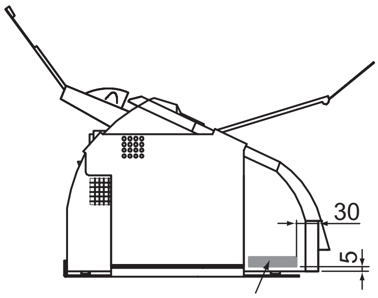
1. Lay the facsimile on the top of the mounting plate.
2. Align right side and rear with the projection on the mounting plate.



3. Fasten fixing plates (left, right) to the facsimile with six M4x15 pan head screws.



4. Attach the compass safe distance label at the location shown below.



Compass safe distance label

How to change modem settings

1. Press [Menu/set], [*], [2], [8], [6] and [4] keys in this sequence to enter the maintenance mode. The fax machine beeps for approximately one second and displays "MAINTENANCE" on the LCD. This means the FAX is in the initial stage of the maintenance mode.
2. Press [1] and [0] keys in this order. "WSW00" is displayed on the LCD.
3. "Press [1] and [3] keys in this order. "WSW13=X1X2X3X4X5X6X7X8" appears on the LCD. (default: WSW13=01011011)
4. Press [0], [0], [0], [1], [1], [0], [1], [0] and [Menu/Set] keys in this order. (WSW13=00011010) "WSW00" appears after pressing [Menu/Set] key.
5. Press [Stop/Exit] key to return the machine to the initial stage of the maintenance mode.
6. Press [9] key twice to exit from the maintenance mode and return to standby.

1.6 Telephone FC755D1 (Option)

General

The telephone can be installed on a desktop or a bulkhead. Select a location where the telephone can easily be operated.

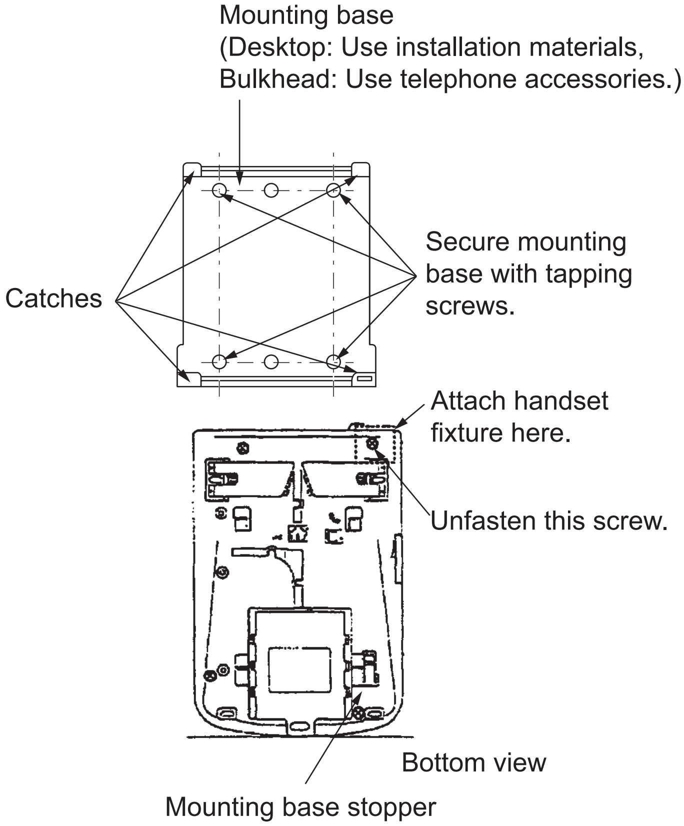
- For installation on a wooden table, use the mounting base and self-tapping screws (supplied).
- For installation on a steel table, fix the telephone with nuts and bolts.
- For bulkhead mounting, use the bulkhead mounting base (supplied with telephone accessories).

Mounting location

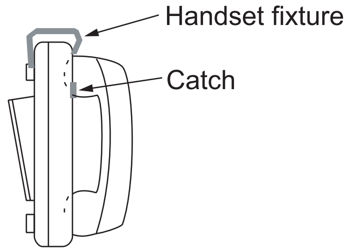
Select a location where temperature and humidity are moderate and stable. Secure sufficient space around the unit for ease of operation and maintenance.

<u>How to mount</u>

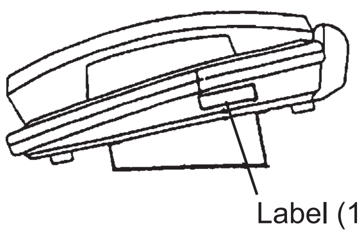
The mounting dimensions are shown in the outline drawing at the back of this manual. Determine the mounting location, leaving sufficient space around the unit, and then fix the mounting base to the mounting location. The mounting base is different for bulkhead and desktop mounts, however the mounting procedure is the same for all.



1. Set the mounting base to the mounting location with four self-tapping screws (4x16).
2. On the bottom of the telephone, release the screw shown in the figure. (The screw may be discarded.) Attach the vulcanizing tape (supplied) to the handset fixture. Fasten the handset fixture to the bottom of the telephone with a screw (3x14, supplied).
3. The catch in the receiver cradle functions to hang up the handset. Set the catch in the upward position. To detach the handset from the hanger, slide the handset upward.)
4. Set the telephone to the four catches in the mounting base, then slide it toward you until you hear a click.
5. Attach the "SLIDE" label (supplied) to the handset.

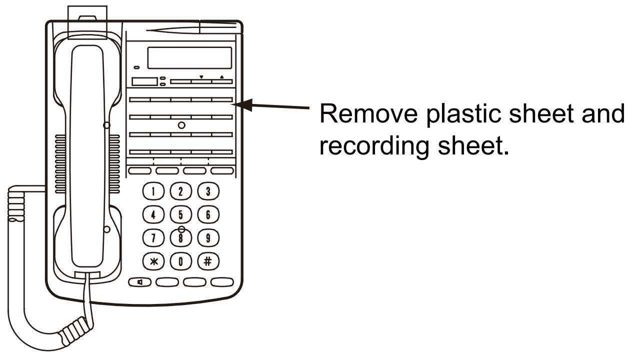


6. Attach the label (16-007-6927-0) for compass safe distance as shown below.

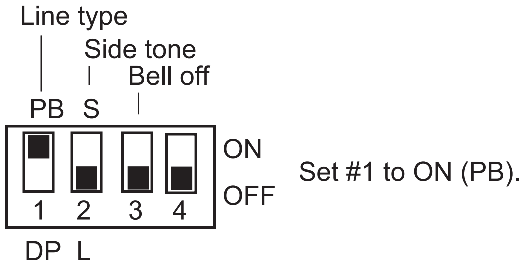


7. Set the line type of telephone to PB (Push Button) type from DP (Dial Pulse) type as follows.

1) Remove the plastic sheet and recording sheet.



2) Set #1 DIP switch to ON (PB side).

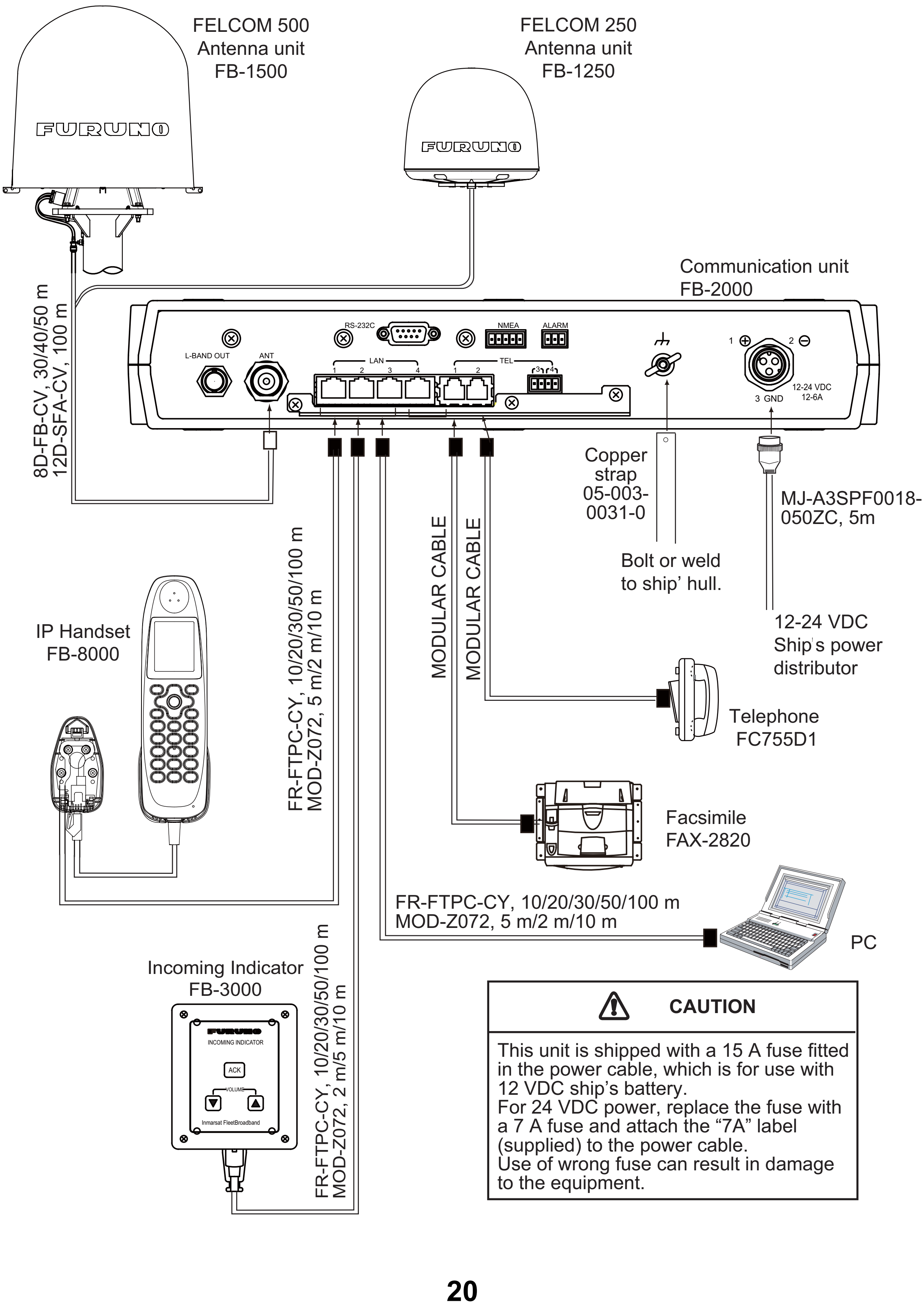


3) Reattach the plastic sheet and recording sheet.

2. CONNECTIONS

2.1 Standard Connection

Run and connect cables, refering to the figure below and the interconnection diagram (page S-1).



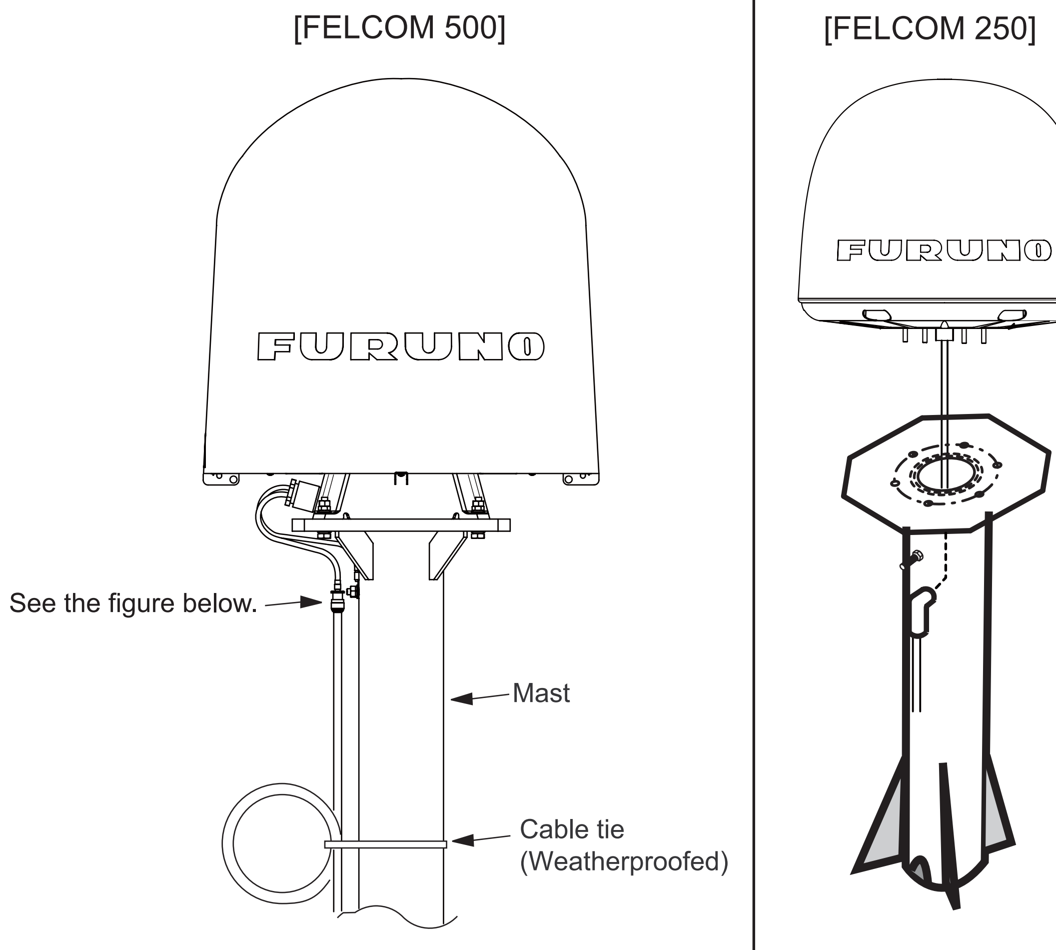
⚠ CAUTION

This unit is shipped with a 15 A fuse fitted in the power cable, which is for use with 12 VDC ship's battery.
For 24 VDC power, replace the fuse with a 7 A fuse and attach the "7A" label (supplied) to the power cable.
Use of wrong fuse can result in damage to the equipment.

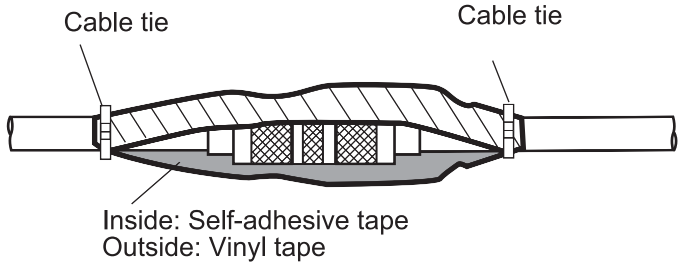
2.2 Antenna Cable

Run the antenna cable (coaxial cable 8D-FB-CV, 30 m, 40 m or 50 m supplied) between the antenna unit and communication unit . Attach the connector plug of the antenna cable to the antenna unit. Connect the coaxial connector (8D-FB-CV) to the other end of the antenna cable.

Wrap the junction point of connectors with the self-adhesive tape then vinyl tape. Bind the ends of tape with a cable tie (local supply). Fix the cable to the mast with a cable tie (local supply).



Mouting

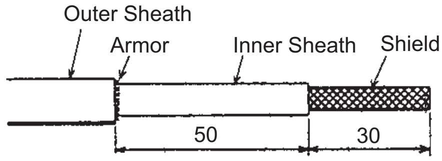


Waterprooting the coaxial connector

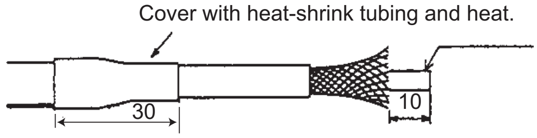
How to attach the antenna cable connector N-P-8DFB-CF

Attach the coaxial plug (supplied) to the other end of the coaxial cable to connect to the CU as follows.

(Dimensions in millimeters.)

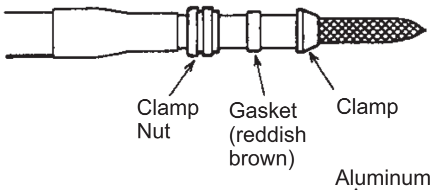


Remove outer sheath and armor by the dimensions shown left.
Expose inner sheath and shield by the dimensions shown left.

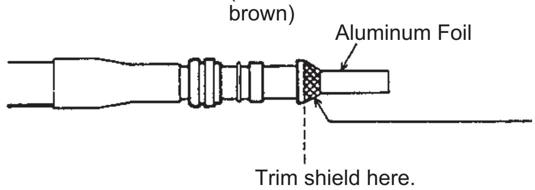


Remove insulator and core by 10 mm.

Twist shield end.

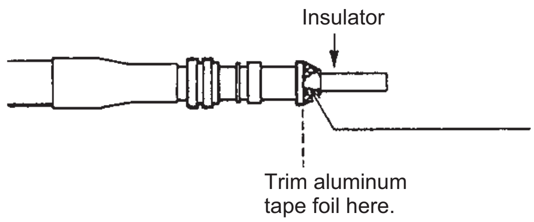


Slip on clamp nut, gasket and clamp as shown left.

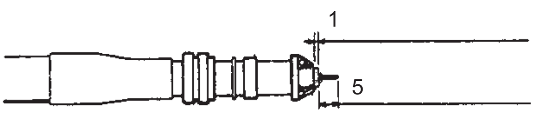


Fold back shield over clamp and trim.

Cut aluminum foil at four places, 90° from one another.

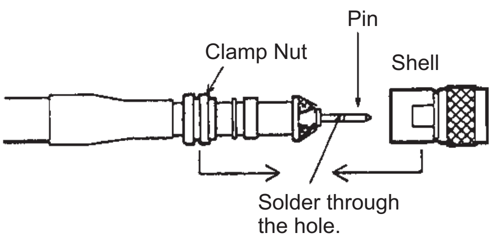


Fold back aluminum tape foil onto shield and trim.



Expose the insulator by 1 mm.

Expose the conductor (core) by 5 mm.

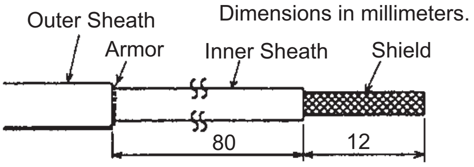


Slip the pin onto the conductor. Solder them together through the hole on the pin.

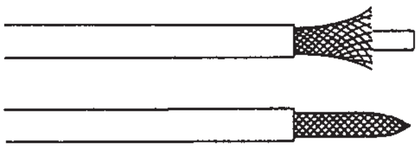
Insert the pin into the shell. Screw the clamp nut into the shell.
(Tighten by turning the clamp nut. Do not tighten by turning the shell.)

How to attach the antenna cable connector N-SP-12DSFA-CF

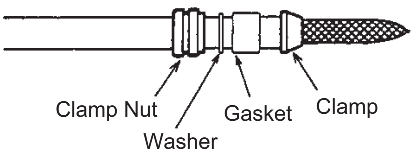
If the optional coaxial cable 12D-SFA-CV (100 m) is used, attach the optional coaxial plug N-SP-12DSFA-CF as follows.



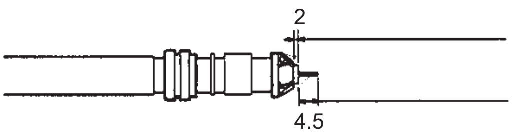
Remove outer sheath and armor by the dimensions shown left.
Expose inner sheath and shield by the dimensions shown left.



Twist shield end.

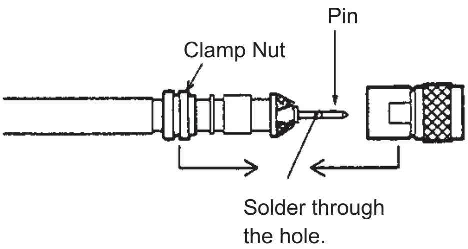


Slip on clamp nut, gasket and clamp as shown left.



Expose the insulator by 2 mm.

Expose the core by 4 to 5 mm.



Slip the pin onto the conductor. Solder them together through the hole on the pin.

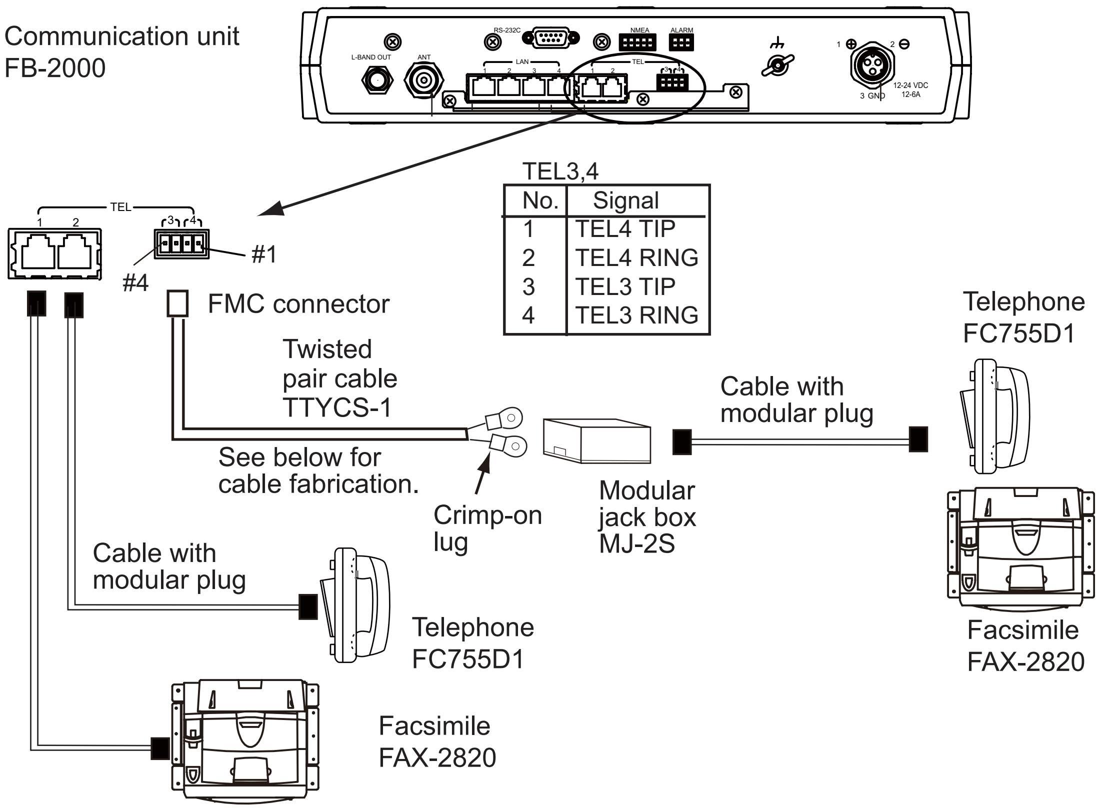
Insert the pin into the shell. Screw the clamp nut into the shell.
(Tighten by turning the clamp nut. Do not tighten by turning the shell.)

2.3 Communication Unit

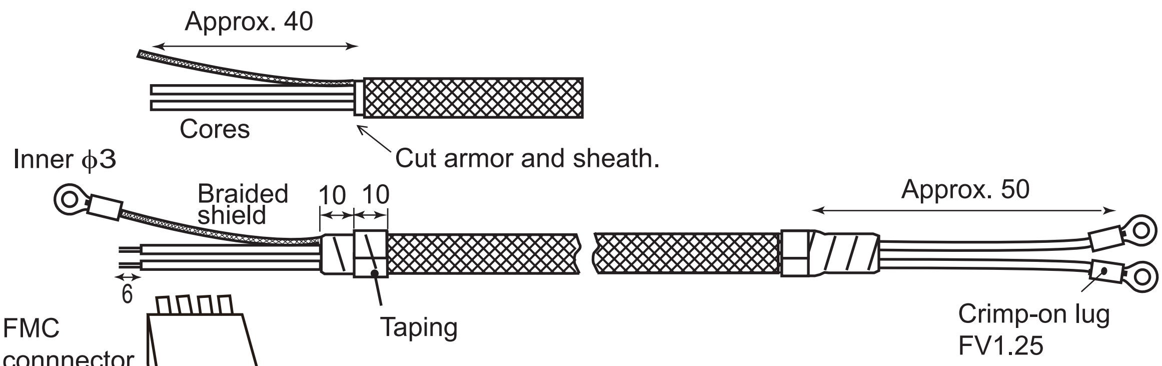
Telephone FC755D1 and Facsimile FAX-2820

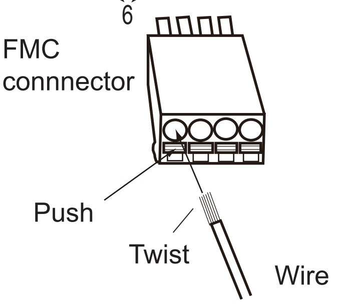
Connect the cable from the telephone or facsimile to TEL1, 2, 3 or 4 port of the communication unit. The modular connector can be connected directly to the TEL1 or TEL2 as shown in the figure below.

To connect to the TEL3 or TEL4, use the modular jack box (optional supply) or the modular jack set (optional supply). Connect TTYCS-1 (Japan Industry Standard cable, or equivalent, local supply) between the modular jack box and communication unit. Attach two crimp-on lugs (FV1.25-3 red, supplied with the modular jack box) to the modular jack box side of the above cable



TTYCS-1 Cable fabrication

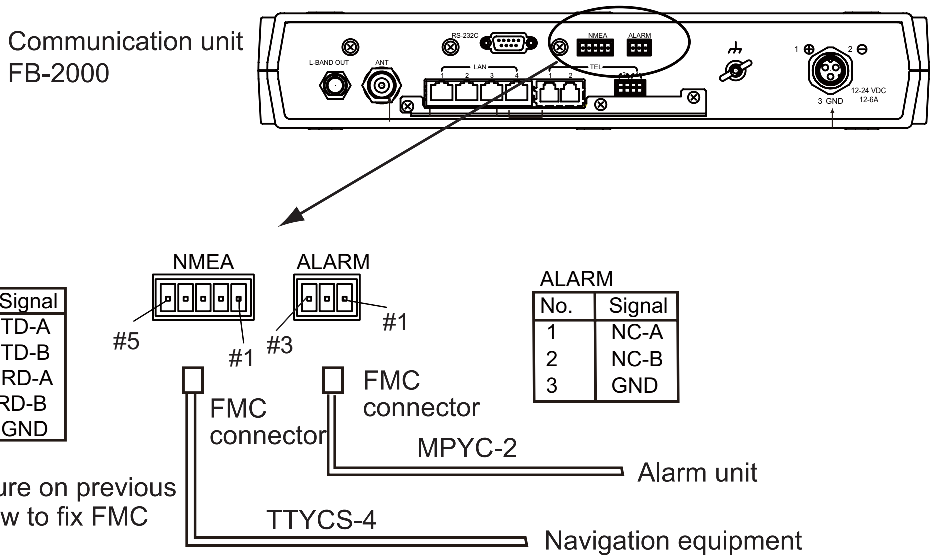




Procedure to insert wire

1. Twist core.
2. Push spring-loaded catch with slotted-head screwdriver.
3. Insert core into hole.
4. Release the screwdriver.
5. Pull wire to confirm it is securely inserted.

NMEA signal, External alarm



NMEA

No.	Signal
1	TD-A
2	TD-B
3	RD-A
4	RD-B
5	GND

ALARM

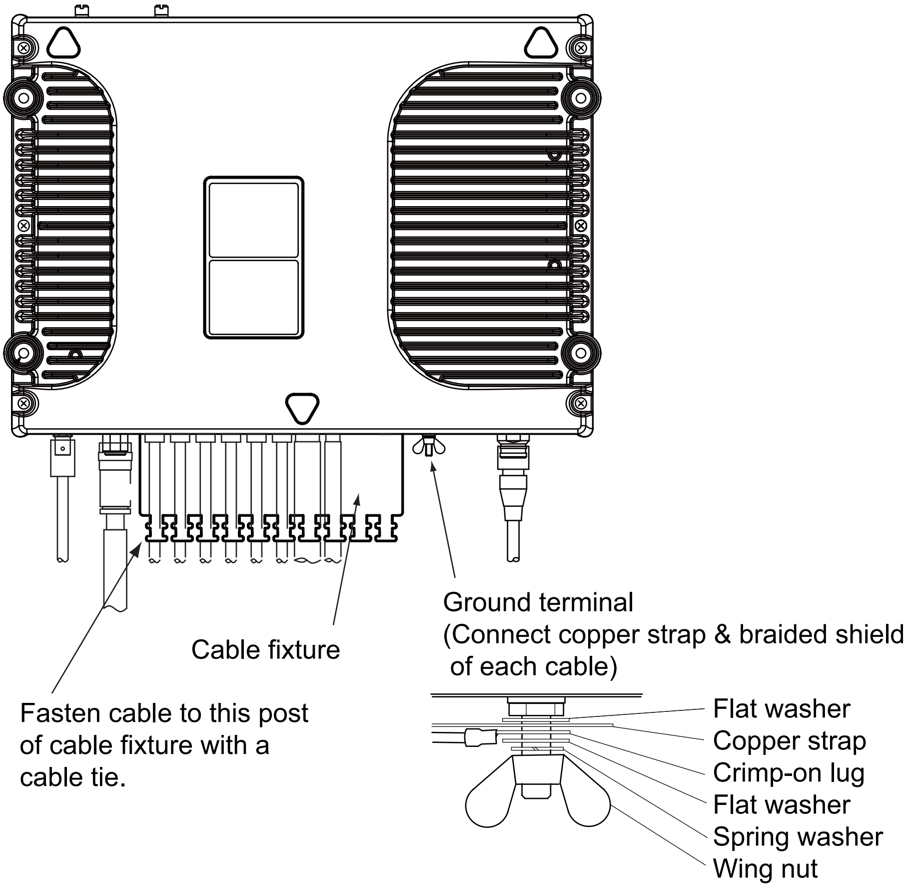
No.	Signal
1	NC-A
2	NC-B
3	GND

See the figure on previous page for how to fix FMC connector.

NMEA input sentence
GGA, GLL, GNS, RMA, RMC, VTG, ZDA
(Talkers for GNS are GN, GP and GL only.
For other sentences any talker will do.)

Cable fixture

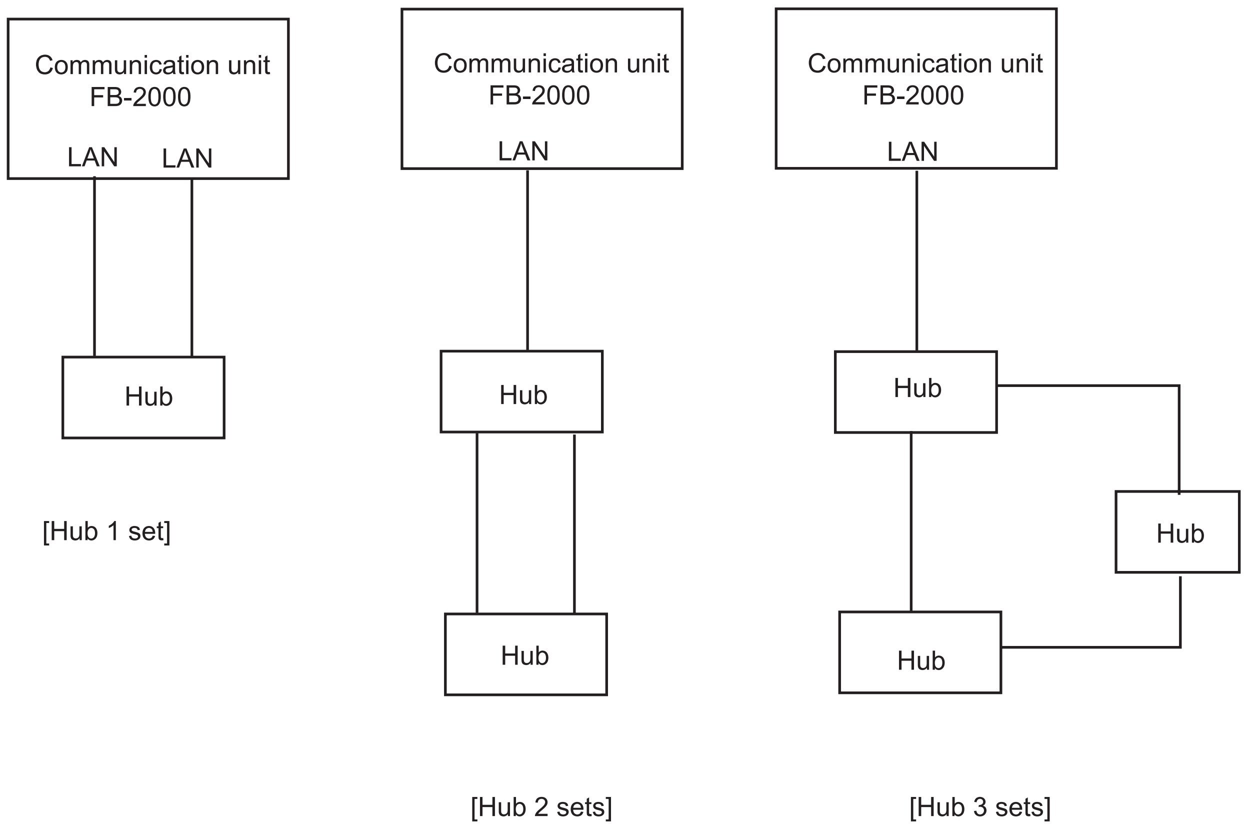
To connect the LAN and TEL lines, attach the cable fixture (supplied) to the rear panel of the communication unit. Then insert the connectors to each port. Fasten each cable with a cable tie (supplied) to the cable fixture. Connect the braided shield wire of each cable to the ground terminal.



2.4 Notice for network connection

With a hub(s), FELCOM500/FELCOM250 can establish a network configuration. If the hub(s) is connected in loop form, the FELCOM500/FELCOM250 may not function normally.

Never connect as follows:



Note: If you install a switching hub that does not have an automatic function to distinguish straight/ cross (MDI/MDI-X) connections, you will need to select a proper cable:

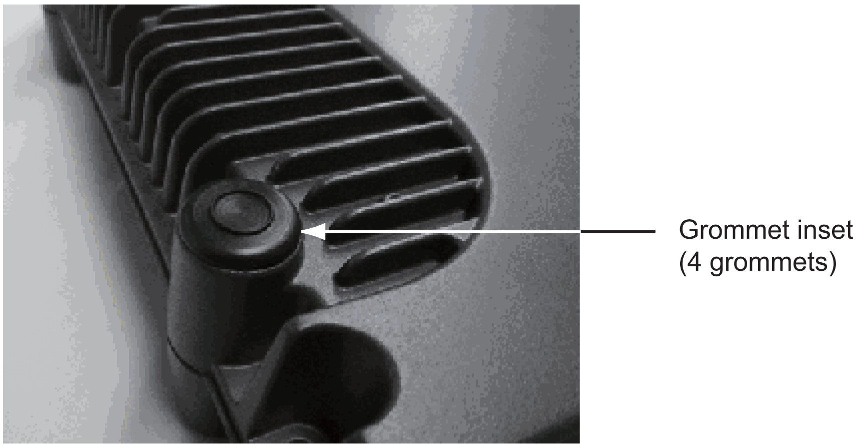
- Use a straight connection cable for an MDI to MDI-X connection.
- Use a cross connection cable for an MDI to MDI or MDI-X to MDI-X connection.

Generally, it is advisable to use an auto MDI/MDI-X switching hub.

2.5 Desktop Installation of Communication Unit to-comply with IPX2 (dripping) standard

How to inset the grommet

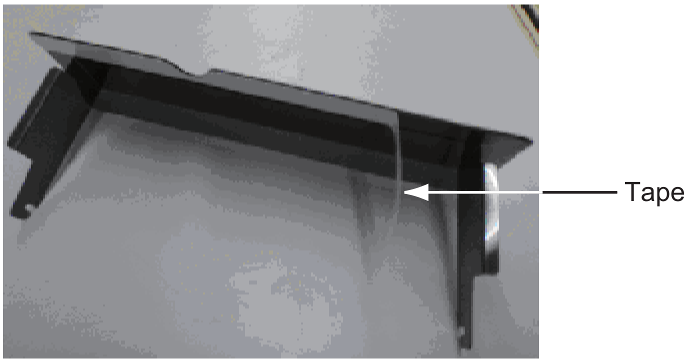
Be sure to install the Communication Unit to a desktop to protect from dripping. After installing, affix the grommets over the mounting screws.



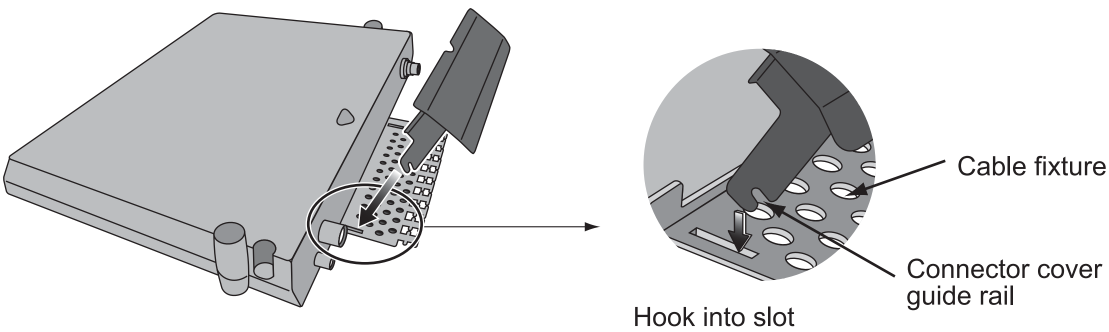
How to install the connector cover

After connecting the cables, perform the following to affix the connector cover.

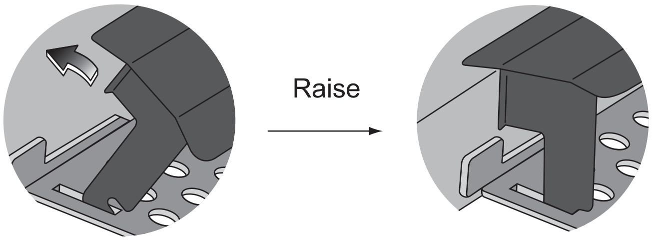
1. Peel off the double sided tape (white) from the connector cover.



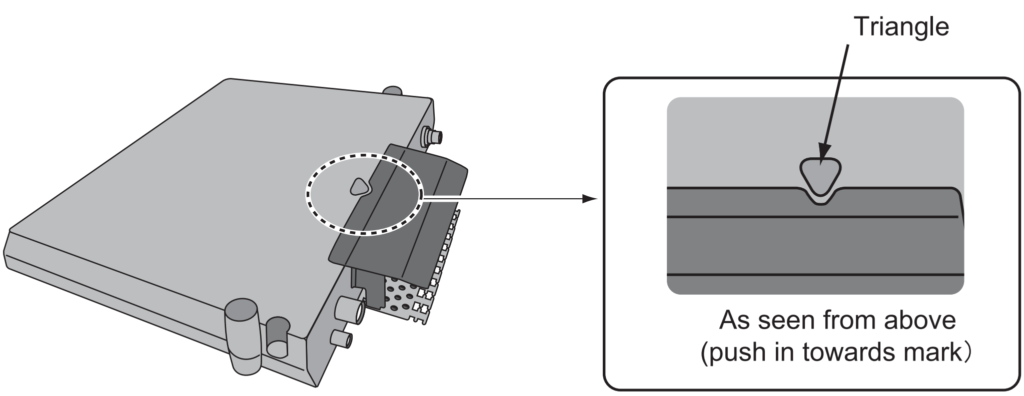
2. Plug the guide rail of the connector cover into the slots as shown, and pull slightly to hook into the slot.

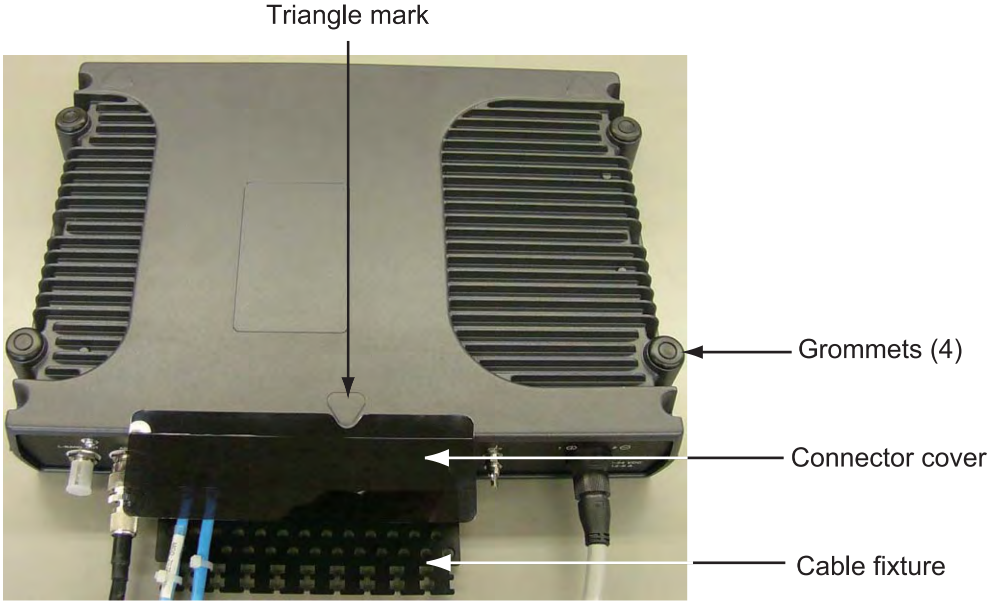


3. With the connector cover rail in the slot, raise the connector cover in the direction of the arrow as shown below.



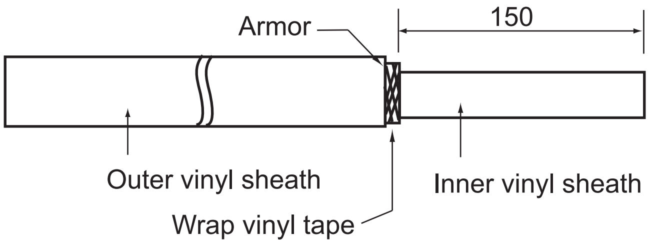
4. Push the connector cover in towards the triangle mark on the center top of the Communication Unit to affix.





2.6 LAN Cable Fabrication

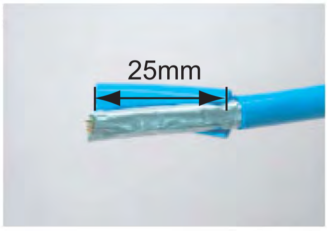
Fabricate an optional LAN cable (FR-FTPC-CY 10, 20, 30, 50 or 100 m) as follows. Cut armor and outer vinyl sheath as shown below and then connect the modular connector MPS588-C (option) to both ends.



1

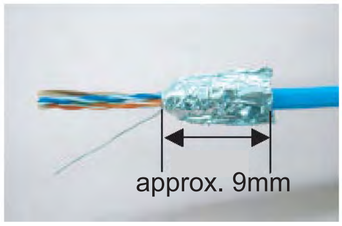
Expose inner vinyl sheath.

2



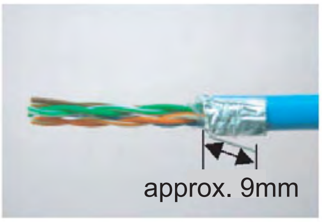
Remove the outer sheath by approx 25 mm. Be careful not to damage inner shield and cores.

3



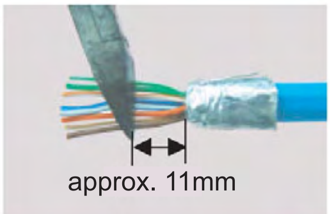
Fold back the shield, wrap it onto the outer sheath and cut it, leaving 9 mm.

4



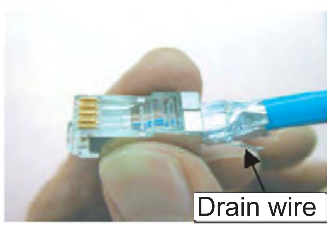
Fold back drain wire and cut it, leaving 9 mm.

5



Straighten and flatten the core in order and cut them, leaving 11 mm.

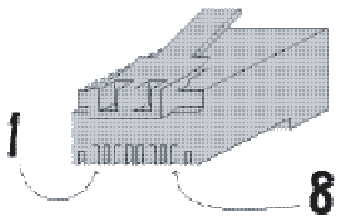
6



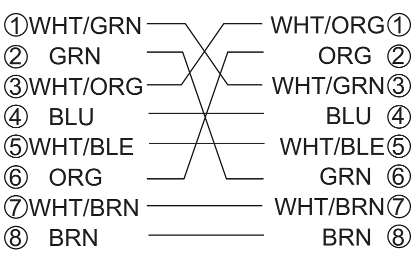
Insert the cable into the modular plug so that the folded part of the shield enters into the plug housing. The drain wire should be located on the tab side of the jack.

7

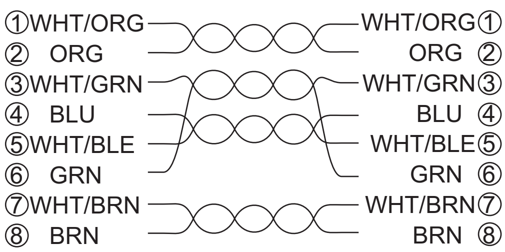
Using special crimping tool MPT5-8 (PANDUIT CORP.), crimp the modular plug. Finally check the plug visually.



[Crose cable]



[Straight cable]



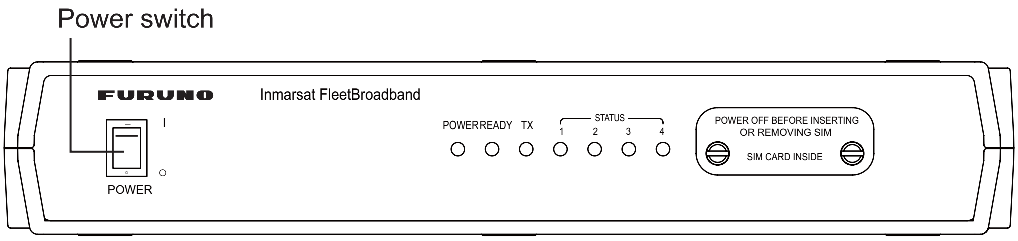
3. SETTING AFTER INSTALLATION

This chapter shows how to enter basic settings, done by the installation technician. For the network setting, request to an administrator of the ship network. (Refer to the Operator's Manual for details.)

The SIM card is required to communicate via a satellite, but not required for the following system settings. "(SIM): No SIM detected" appears in the Web software screen. Disregard the warning.

3.1 Preparation for Setting

1. Turn on the PC and insert the CD-ROM (supplied with accessories) in the PC.
2. Open the CD-ROM and copy "FELCOM_FB" shortcut icon to the desktop of the PC. This shortcut icon accesses the FELCOM 500/FELCOM 250 (IP address 192.168.1.1) through the Internet Explorer.
3. Connect the PC to the Communication unit with a LAN cable.
4. Turn on the Communication unit. The initialization begins. Wait until all STATUS LEDs light. During this time, the PC cannot access the Communication unit. Wait for a while.



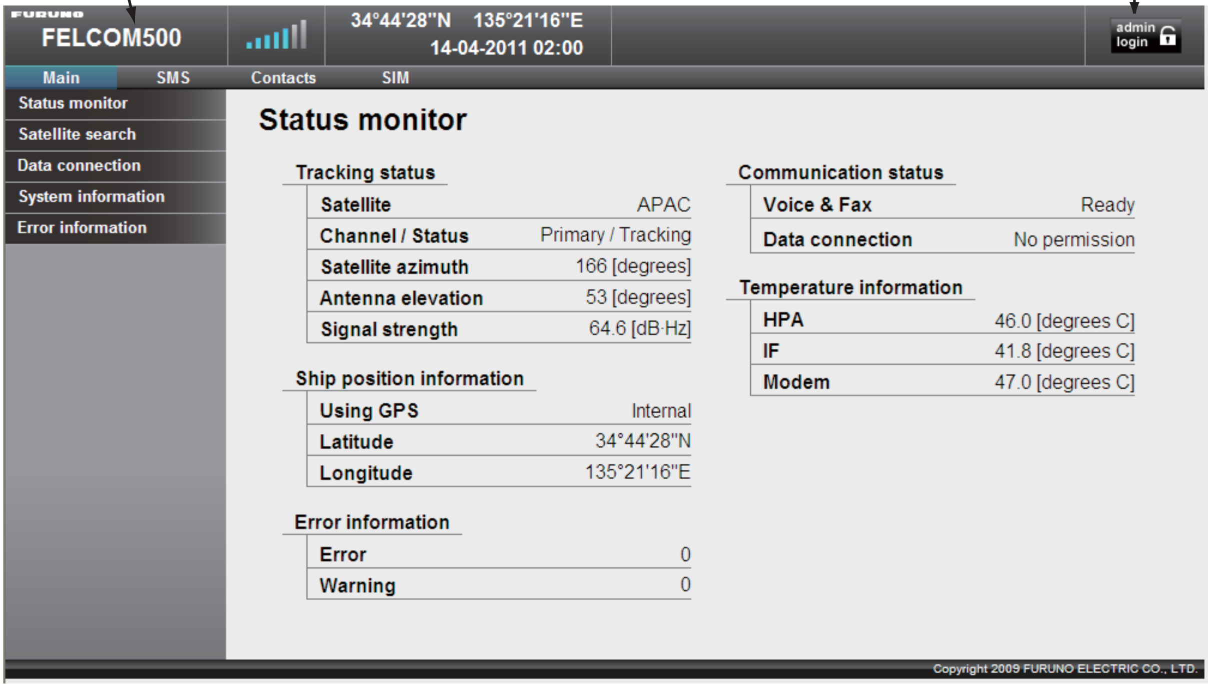
Communication unit

5. To set the IP address of the PC, select "Obtain an IP address automatically" in the Internet Protocol (TCP/IP) Properties. If you set manually, set IP address according to the IP address of the communication unit (default 192. 168.1.1).
6. Double-click the "FELCOM_FB" shortcut icon on the PC desktop.

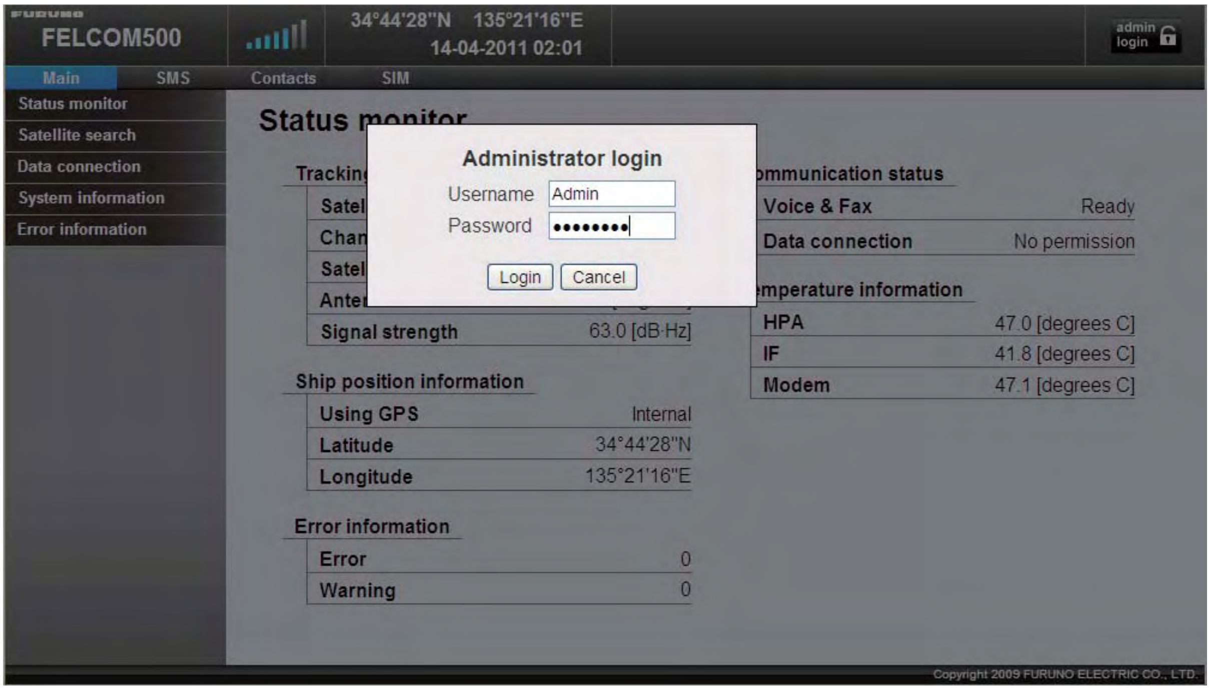
The browser starts and the main menu of the Web software in the FELCOM 250/500 opens.

For FELCOM 250, “FELCOM 250 is indicated.

Administrator Login

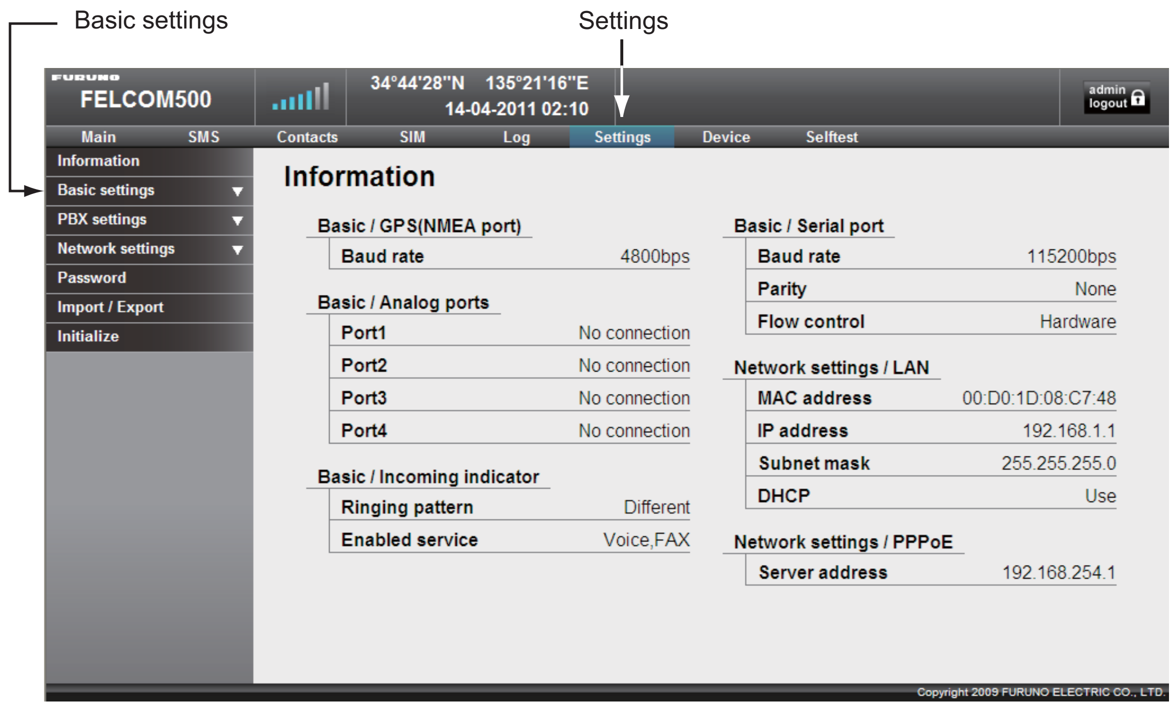


7. Click the **Administrator Login** button on upper right hand side on the screen.The Login window opens.
8. Key in username "Admin" and password "01234567"(default value).The administrator can change the password in another menu.

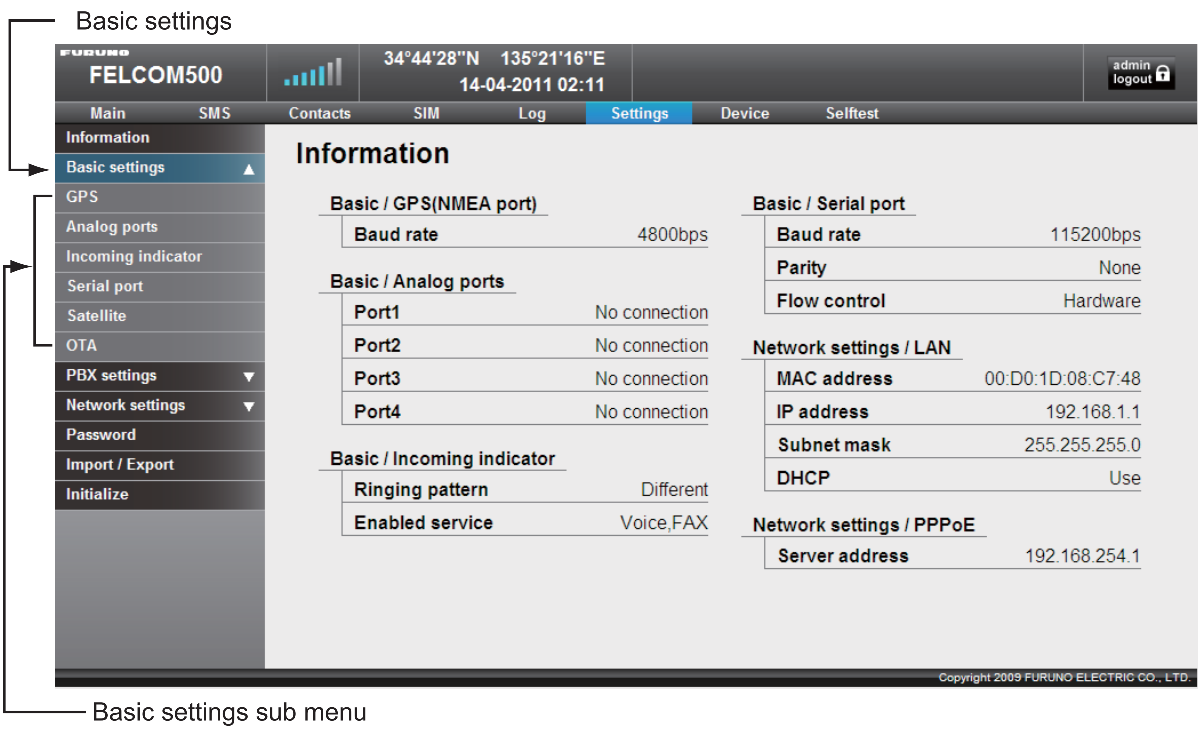


9. Click the **Login** button.
   New menu items appear on the menu bar; Log, Settings, Device, and Selftest.

10. Click **Settings** on the menu bar.
    The sub menu appears on left side and current setting appears in the Information window on right side.



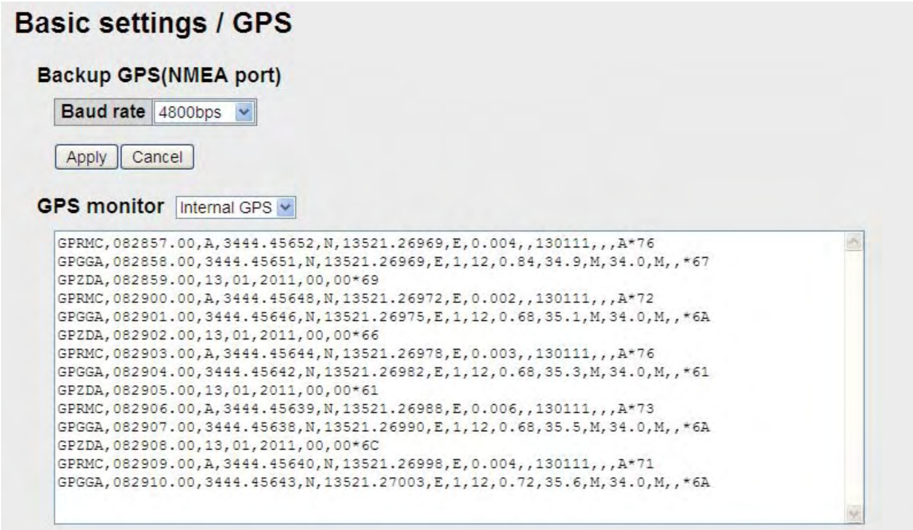
11. Click **Basic settings** on the sub menu.
    The sub menu of the Basic settings appears



Use these sub menus to set the basic settings, following the procdeures on the next several pages.

3.2 GPS Setting

1. Click **GPS** on the Basic settings sub menu.

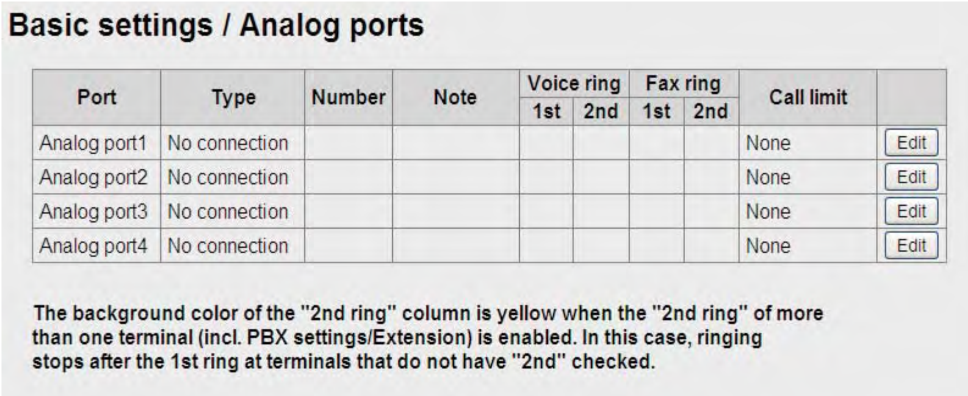


2. If an external GPS is connected to the NMEA port on the communication unit, set the baud rate to 4800 bps or 38400 bps according to the GPS connected.
3. Click the **Apply** button.
4. To monitor output sentences from the GPS, select a GPS among Internal GPS, NMEA port, and None. "None" displays no sentences.

3.3 Analog Port Setting

Set for analog telephones/faxes that are connected to the TEL ports as follows.

1. Click **Analog ports** on the Basic settings sub menu.

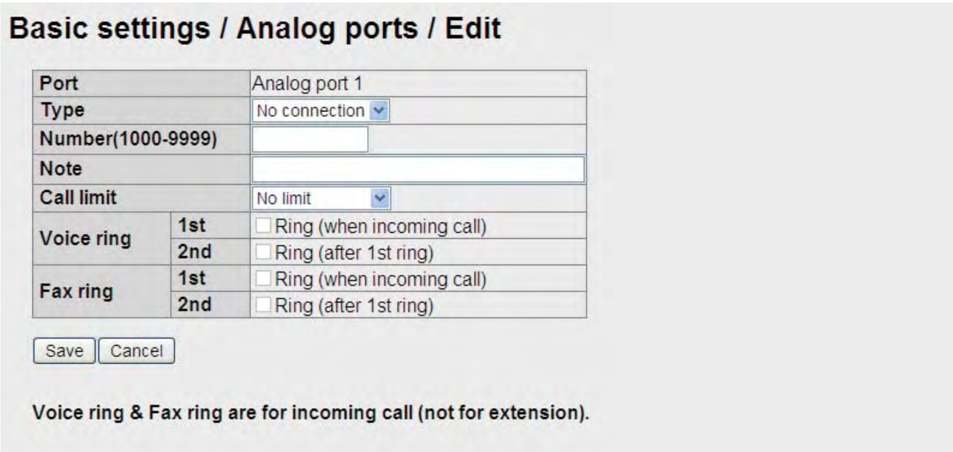


Basic settings / Analog ports

Port	Type	Number	Note	Voice ring		Fax ring		Call limit	
				1st	2nd	1st	2nd		
Analog port1	No connection							None	Edit
Analog port2	No connection							None	Edit
Analog port3	No connection							None	Edit
Analog port4	No connection							None	Edit

The background color of the "2nd ring" column is yellow when the "2nd ring" of more than one terminal (incl. PBX settings/Extension) is enabled. In this case, ringing stops after the 1st ring at terminals that do not have "2nd" checked.

2. In the Type box, select the equipment that is connected to the TEL port.



3. There are four TEL ports (TEL 1 to TEL 4), TEL 1 is analog port 1 in the table. The selections are as follows:
   - TEL: Analog telephone
   - FAX: Facsimile
   - TEL & FAX: Facsimile telephone
   - No Connection: Nothing connected
4. Key in extension telephone number in the Number box. The setting range is between 1000 and 9999.
5. In the Note box, key in a name; user name, setting location, etc. This is the name a called party sees. Up to 50 alphanumeric characters can be used. Do not use symbols, "?", "/", etc.
6. Set the call limit time in the Call limit box.
   - No limit: No time limit
   - Extension only: Limit call time on extension phones only
   - Incoming only: Limit call time on incoming calls only
   - Outside only: Limit call time on outside lines only

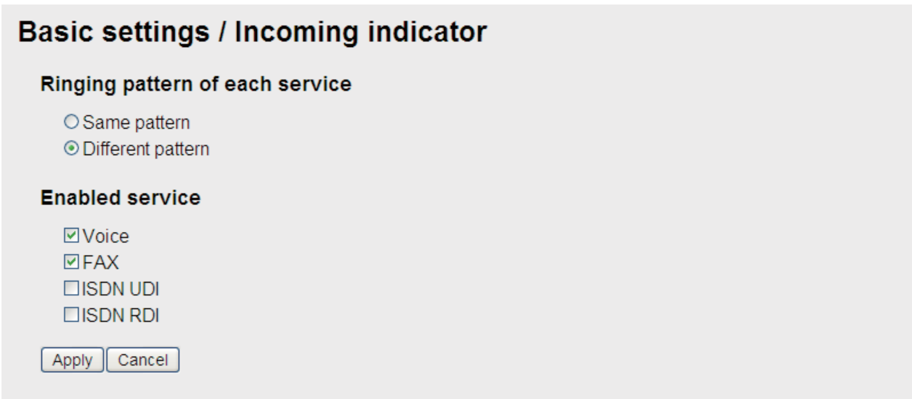
7. Set up outside line calls in the Voice ring box.
   If you selected TEL at step 3, “1st” is checked. Then, any terminals that have ”1st” checked ring first. Remove the check for no ring. Check “2nd” to ring 2nd terminal when there is no answer at the terminal that have ”1st “checked. Ring duration time can be set on the PBX settings/Incoming routing/Voice screen. (See the operator’s manual.)
8. Set up fax call in the Fax ring box. (Same as the Voice ring.)
   If you selected FAX or TEL&FAX at step 3, “1st” is checked.
9. Click the [Save] button. The message "Setting Completed" at successful completioni of the saving.
10. Click the [OK] button to erase the message

Note: If “2nd” is checked on the Basic settings/Analog ports screen or PBX settings/Extension screen, the background color of the 2nd column on the Analog ports screen becomes yellow. In this condition, terminals that do not have “2nd” checked stop ringing after the time specified has elapsed.

3.4 Incoming Indicator Setting

If the optional Incoming Indicator is connected, set it as follows.

1. Click **Incoming Indicator** in the Basic settings sub menu.

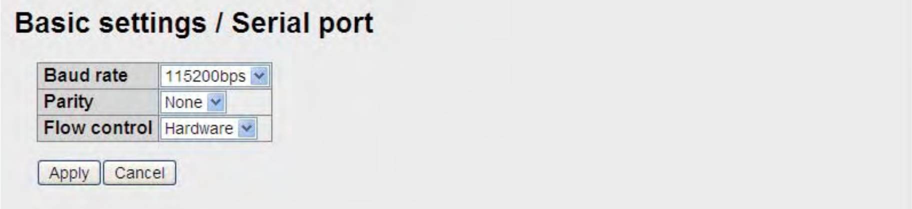


2. Select the ringing pattern of the incoming indicator in the "Ringing pattern of each service", between same pattern and Different pattern.
   Same pattern: Same ringing pattern for any communication service.
   Different pattern: Different ringing pattern for each communication service.
3. Check a communication services to ring the incoming indicator.
   - Voice: Ring for incoming telephone.
   - FAX: Ring for incoming facsimile.
   - ISDN UDI: Ring for incoming ISDN UDI data communication (FELCOM500 only) .
   - ISDN RDI: Ring for incoming ISDN UDI data communication (FELCOM500 only).
4. Click the **Apply** button to conclude the setting.

3.5 Serial Port Setting

Set for the equipment that is connected to the RS-232C port.

1. Click Serial port in the Basic settings sub menu.

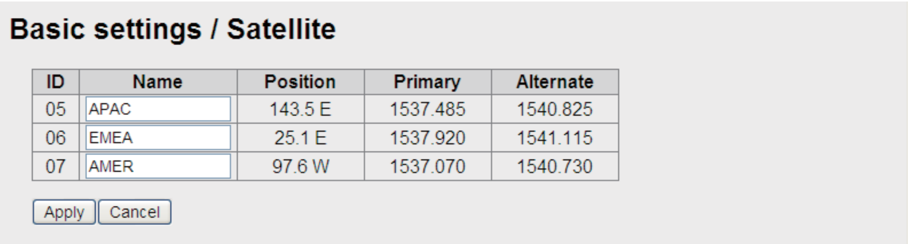


2. Select a baud rate from the Baud rate drop-down list. The selections are 9600, 19200, 38400, 57600 and 115200 bps.
3. Set a parity bit in the Parity box. The selections are None, Even and Odd.
4. Select the Flow control among Hardware, Software and None.
5. Click the **Apply** button to complete the setting.

3.6 Satellite Setting

The three satellites are named APAC (Asia-pacific), EMEA (Europe-Middle east-Africa) and AMER (America). To change satellite name, do as follows.

1. Click **Satellite** in the Basic settings sub menu.

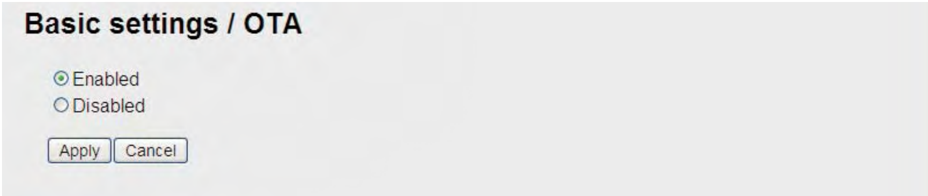


2. Put the cursor in the Name box and enter the name of the satellite (max. 10 characters).
3. Click the Apply button to complete the setting.
   The meaning of the table items is as follows.
   - ID: Identification of the satellite
   - Position: Position of the geostationary satellite (longitude)
   - Primary: Frequency of the first global channel of the satellite
   - Alternate: Frequency of the second global channel of the satellite

3.7 OTA Setting

OTA stands for Over The Air. The OTA function permits remote management of files in the SIM card.

1. Click **OTA** in the Basic setting sub menu.



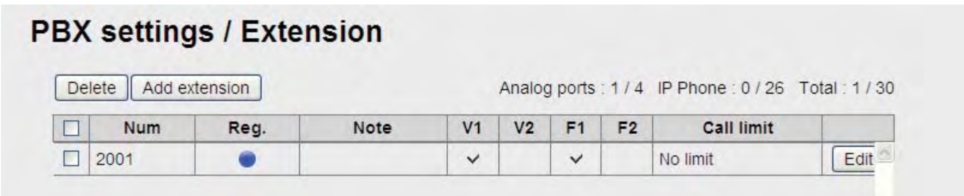
2. To enable the OTA, click the Enabled radio button. To disable the OTA, click the Disabled radio button.
3. Click the **Apply** button to complete the setting.
   With Enabled, OTA functions as follows.
   a) User requests a change of contract contents to a SIM maker.
   b) The SIM maker transmits an OTA message to the terminal.
   c) The terminal receives the OTA message and modifies the internal parameters according to the contract contents.

3.8 Handset Setting

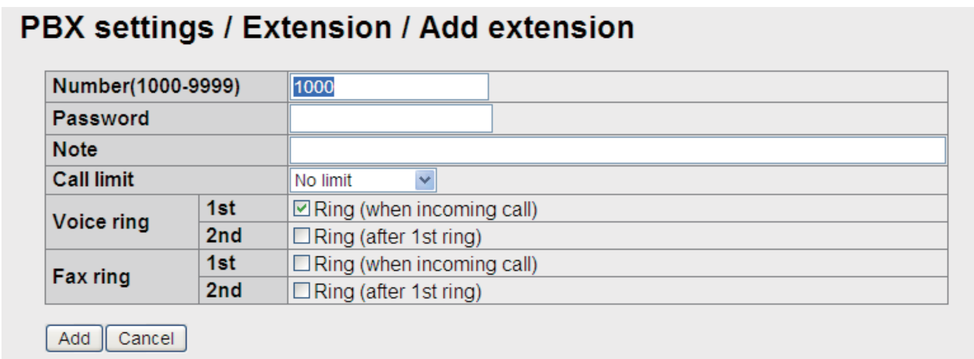
To use the IP handset, set the Web software and the IP handset as follows.

Web software setting

1. Click **Settings** in the menu bar.
2. Click **PBX Settings** in the Settings sub menu at the left side of the screen.
3. Click **Extension** in the PBX Setting sub menu.



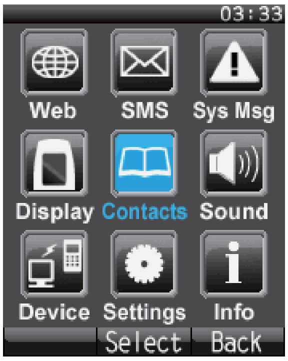
4. Click the Add extension button.
   The following window appears. The lowest unregistered number between 1000 and 9999 appears in the Number box. To use this number, go to step 6. To register a different number, go to step 5.

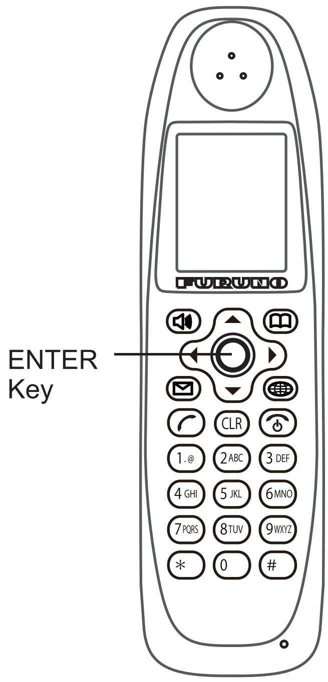


5. Key in a new extension number in the Number box (1000-9999).
   You cannot use a number that is already entered. If you enter the same number, an error message will appear at the registration.
6. Key in a password in the Password box (a maximum of eight alphanumeric characters). Upper case alphabet can be used.
   Note: Do not forget to write down the telephone number and password.
7. If necessary, enter a comment in the Note box (a maximum of 50 characters), for example, user name, setting location, etc.
8. Set the call limit time in the Call limit box.
   - No limit: No time limit
   - Extension only: Limit call time on extension phones only
   - Incoming only: Limit call time on incoming calls only
   - Outside only: Limit call time on outside lines only
9. Enter the outside line settings in the Voice ring box.
10. Enter the fax settings in the Fax ring box.
11. Click the [Add] button
12. Click the [OK] button.
    The registered number appears on the Extension screen.
13. To register multiple telephones, repeat steps 4 to 12.

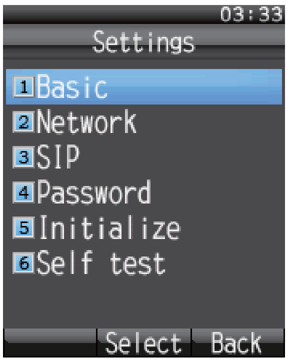
Setting in the IP handset

1. Push the **Enter** key at the idle screen to show the main menu.

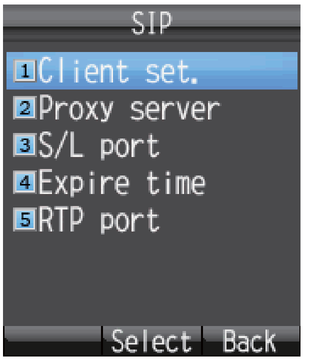




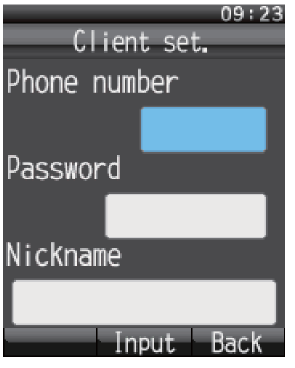
2. Push 6 to select the Settings icon and then push the **Enter** key to show the Settings menu.



3. Push 3 key to show the SIP menu.



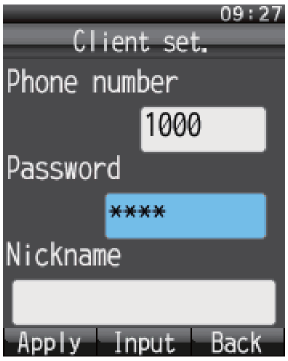
4. Push 1 key to show the Client setting screen.



5. With the Phone number box highlighted in blue, push the **Enter** key to show the phone number input screen.

6. Enter the extension number that is registered in the Web software and push the **Enter** key. If something has been registered, push the **CLR** key to erase it.
7. Push ▼ to select Password and then push the **Enter** key.

8. Enter the password which was registered in the Web software and then push the Enter key.If the password contains both alphabet and numerals, switch input format with the soft key .



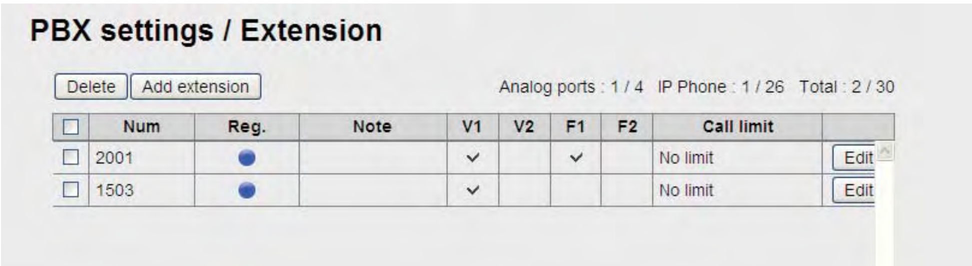
9. Push the soft key (Apply).

   The message "Set" appears and the setting for one IP handset is completed.

10. Push the **CLR** key three times to return to the idle screen.

11. If multiple handsets are connected, repeat the above step 1 to 10 for each handset.

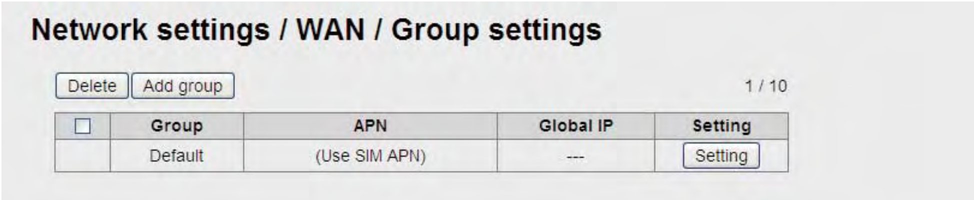
When the Web software-set extension number matches handset-set extension number, the mark with a blue circle appears in the Settings/ PBX settings/ Extension window of the Web software. These handsets can be used for communication. However, the following screen does not update automatically. Press the Reload button of the browser to refresh the screen.



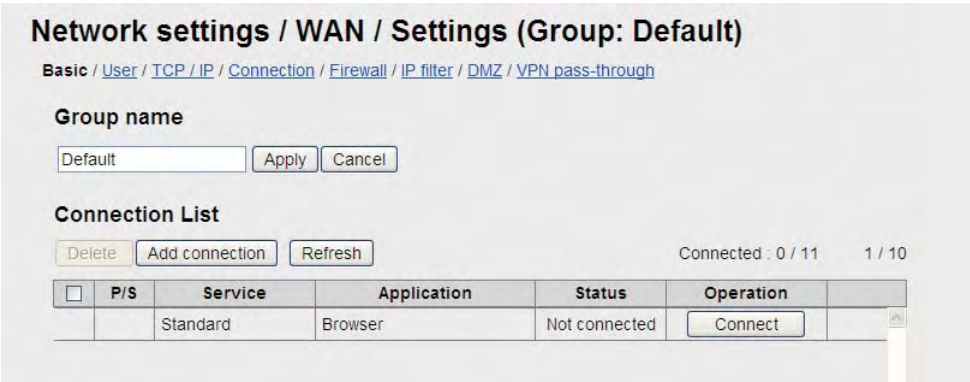
3.9 User Registration (for data connection)

Register the IP address of the handset and the PC to the user list to enable data connection. If no IP address is entered, the standby screen of the handset shows “D: No permission”, and the Web software screen shows “Data connection No permission”.

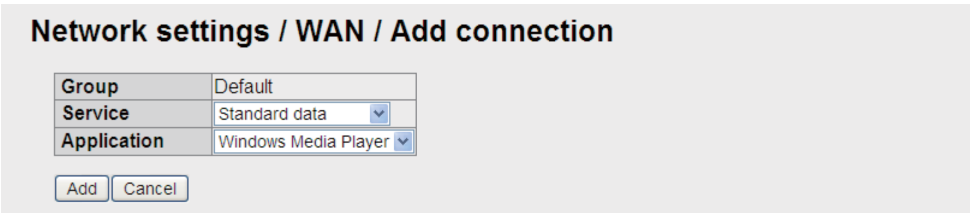
1. Click [Settings] on the menu bar.
2. Click [Network Settings].
3. Click [WAN].
4. Click [Group Settings] to show the Network settings/WAN/Group settings screen.



5. Click the [Setting] button to show the basic setting screen.
   The default setting is “standard IP packet communications service”. For SIM card and you have applied for streaming IP packet communication service, go to step 6. If you have not applied, go to step 11.

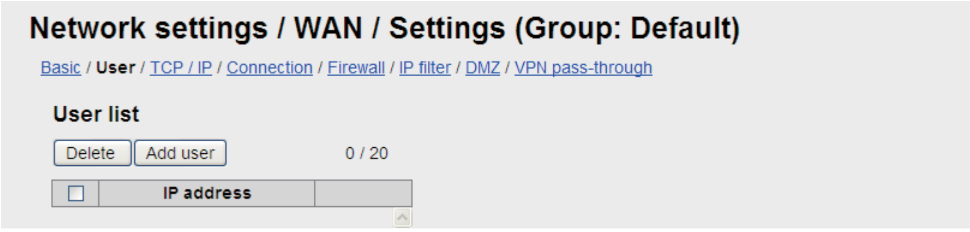


6. Click the [Add connection] button to shown the Add connection screen.



7. Enter the service to use in the Service box.
   Select one among Standard data, 8kbps Streaming, 16kbps Streaming, 32kbps Streaming, 64kbps Streaming, 128kbps Streaming, and 256kbps Streaming*/ * FELCOM 500 only
8. Enter the application to use in the Application box.
   Select among Windows Media Player, Quick Time, Real Player, FTP, and Browser.
9. Click the [Add] button. The message “Completed” appears.
10. Click the [OK] button to erase the message.

11. Click [User] to show the User List screen.



12. Click the [Add user] button to shown the Add user screen.

13. Enter the IP address in the User box. Do not use 127.0.0.1, 255.255.255.255, or the IP address of the communication unit.
    Note: If the IP addresses are the same, only one group can be registered. “192.168.1* and “192.168.1.10” can be registered. * is a wildcard: show network. If you registered two groups this way, the group having the narrowest range (192.168.1.10) has priority.
14. Click the [Add] button. The message "Setting Completed." appears.
15. Click the [OK] button to erase the message.

APPENDIX 1 JIS CABLE GUIDE

Cables listed in the manual are usually shown as Japanese Industrial Standard (JIS). Use the following guide to locate an equivalent cable locally.

JIS cable names may have up to 6 alphabetical characters, followed by a dash and a numerical value (example: DPYC-2.5).
For core types D and T, the numerical designation indicates the *cross-sectional Area (mm²)* of the core wire(s) in the cable.
For core types M and TT, the numerical designation indicates the *number of core wires* in the cable.

1. Core Type

D Double core power line

T Triple core power line

M 1mm Multi core

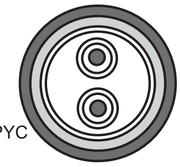
TT 0.75mm twisted pair communications (1Q = quad cable)

2. Insulation Type

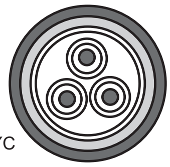
P Ethylene Propylene

3. Sheath Type

Y Vinyl



DPYC



TPYC

4. Armor Type

C Steel

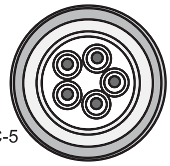
5. Shielding Type

Y Corrosive resistant

6. Core Sheath

S All cores in one sheath

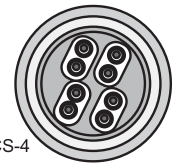
-S Individually sheathed cores



MPYC-5

EX: $\overset{1\,2\,3\,4\,5\,6}{\underset{\text{Designation type}}{\text{DPYCYS}}} - \underset{\text{Core Area (mm}^{2}\text{)}}{1.5}$

$\overset{1\,2\,3\,4}{\underset{\text{Designation type}}{\text{MPYC}}} - \underset{\text{\# of cores}}{5}$



TTYCS-4

The following reference table lists gives the measurements of JIS cables commonly used with Furuno products:

Type	Core Area	Core Diameter	Cable Diameter	Type	Core Area	Core Diameter	Cable Diameter
DPYC-1.5	1.5mm²	1.56mm	11.7mm	TPYCY-1.5	1.5mm²	1.56mm	14.5mm
DPYC-2.5	2.5mm²	2.01mm	12.8mm	TPYCY-2.5	2.5mm²	2.01mm	15.5mm
DPYCY-2.5	2.5mm²	2.01mm	14.8mm	TPYCY-4	4mm²	2.55mm	16.9mm
DPYCYS-1.5	1.5mm²	1.56mm	14.6mm	TPYCYS-1.5	1.5mm²	1.56mm	15.2mm
DPYCYS-2.5	2.5mm²	2.01mm	15.5mm				
MPYC-2	1mm²	1.29mm	10.0mm				
MPYC-4	1mm²	1.29mm	11.2mm				
MPYC-7	1mm²	1.29mm	13.2mm				
MPYCY-12	1mm²	1.29mm	19.0mm				
MPYCY-19	1mm²	1.29mm	22.0mm				
TTYCS-1	0.75mm²	1.11mm	10.1mm				
TTYCS-1Q	0.75mm²	1.11mm	11.3mm				
TTYCS-4	0.75mm²	1.11mm	16.3mm				
TTYCYS-1	0.75mm²	1.11mm	21.1mm				

PACKING LIST FB-2000/8000-A-J/E、-B-J/E

16AQ-X-9852-6 1/1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ﾊﾝﾄﾞｾｯﾄ IP HANDSET	200 / 59 / 52	FB-8000 000-015-761-00	1
通信制御ﾕﾆｯﾄ COMMUNICATION UNIT	375 / 265 / 65	FB-2000-A/-B 000-015-758-00 **	1
通信制御用予備品 COMMUNICATION UNIT SPARE PARTS			
予備品 SPARE PARTS		SP16-01901 001-067-320-00	1
通信制御用工材 COMMUNICATION UNIT INSTALLATION MATERIALS CP16-03810			
ｹｰﾌﾞﾙ(組品)LAN LAN CABLE ASSEMBLY	L=5M	MOD-Z072-050+ 000-167-176-10	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	L=5M	MJ-A3SPF0018-050ZC 000-154-025-10	1
工事材料 INSTALLATION MATERIALS		CP16-03811 001-067-790-00	1
工事材料 INSTALLATION MATERIALS		CP16-03812 001-106-090-00	1
通信制御用付属品 COMMUNICATION UNIT ACCESSORIES FP16-02200			
CD-ROM組品 CD-ROM	142 / 125	1650221- 001-067-330-00	1
ﾊﾝﾄﾞｾｯﾄ工材 HANDSET INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP16-03901 001-067-350-00	1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
図書 DOCUMENT			
ｴｲｾｲｶﾊﾞｰｴﾘｱﾏｯﾌﾟ SATELLITE COVERAGE AREA MAP	210 / 297	C52-01101-* 000-175-262-1*	1
設定事例集 EXAMPLE OF SETTING	210 / 297	*52-01003-* 000-174-622-1* **	1
取扱説明書 OPERATOR'S MANUAL	210 / 297	OM*-56660-* 000-170-976-1* **	1
装備要領書 INSTALLATION MANUAL	210 / 297	IM*-56660-* 000-170-978-1* **	1
操作要領書（ﾀｹﾞﾝ） OPERATOR'S GUIDE (MLG)	210 / 297	MLG-56660-* 000-170-980-1*	1
ﾋｭｰｽﾞ変更のお願い NOTICE FOR FUSE REPLACEMENT	210 / 297	C52-00206-* 000-147-004-1*	1
緊急呼出ｼｰﾄ EMERGENCY CALL SHEET	210 / 297	E52-00905-* 000-172-812-1*	1
型紙 PLATE	420 / 297	C52-00901-* 000-171-039-1*	1

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

16AQ-X-9852

FURUNO

工事材料表 INSTALLATION MATERIALS

ANTENNA UNIT
FB-1500-A/B

CODE NO. | TYPE — 16AQ-X-9406 -0 1/1

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｱﾝﾃﾅｹｰﾌﾞﾙ組品 ANTENNA CABLE ASSY.	L=30M	8D-FB-CV *30M* CODE NO. 000-167-889-11	1	選択 *TO BE SELECTED
2	ｱﾝﾃﾅｹｰﾌﾞﾙ組品 ANTENNA CABLE ASSY.	L=40M	8D-FB-CV *40M* CODE NO. 000-167-890-11	1	選択 *TO BE SELECTED
3	ｱﾝﾃﾅｹｰﾌﾞﾙ組品 ANTENNA CABLE ASSY.	L=50M	8D-FB-CV *50M* CODE NO. 000-168-241-11	1	選択 *TO BE SELECTED

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

☆ FURUNO ELECTRIC CO ., LTD. 16AQ-X-9406

FURUNO

CODE NO.	001-067-790-00	16AQ-X-9404 -3
TYPE	CP16-03811	1/1

工事材料表
INSTALLATION MATERIALS

COMMUNICATION UNIT
FB-2000-A

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾋｭｰｽﾞﾊﾘﾏｰｸ FUSE LABEL	60, 50	03-153-1312-0 ROHS CODE NO. 100-292-140-10	1	
2	ｱｰｽ板 COPPER STRAP	30, L=1.2M	05-003-0031-0 ROHS CODE NO. 590-300-310-10	1	
3	ｹｰﾌﾞﾙ金具 CABLE FIXTURE	70, 171	16-021-2524-3 CODE NO. 100-350-383-10	1	
4	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF TAPPING SCREW	50, φ5	5X50 SUS304 CODE NO. 000-170-987-10	4	
5	ｸﾞﾛﾒｯﾄ GROMMET	φ21, 8	C-30-SG-14A-EP-UL CODE NO. 000-173-335-10	4	
6	ｺﾝﾍﾞｯｸｽ CABLE TIE	150	CV-150N CODE NO. 000-162-186-10	10	
7	+ﾊﾞｲﾝﾄﾞｾﾑｽF BINDER HEAD SCREW-F	8, φ3	M3X8 C2700W MBCR2 CODE NO. 000-163-538-10	3	
8	ｺﾈｸﾀ(N) CONNECTOR	40, φ21	N-P-8DFB-CF CODE NO. 000-156-918-10	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	001-067-350-00	16AQ-X-9405 -0
TYPE	CP16-03901	1/1

工事材料表
INSTALLATION MATERIALS

IP HANDSET
FB-8000

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ 1ｼｭ SELF-TAPPING SCREW	10, φ3	3X10 SUS304 CODE NO. 000-162-604-10	4	
2	ｺﾝﾍﾞｯｸｽ CABLE TIE	150	CV-150N CODE NO. 000-162-186-10	2	

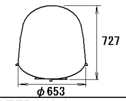
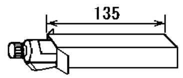
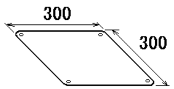
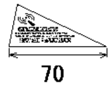
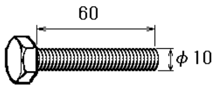
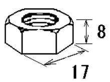
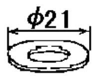
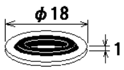
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

PACKING LIST

FB-1500-A

A-5

N A M E	O U T L I N E	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
アンテナユニット ANTENNA UNIT		FB-1500-A 000-015-744-00	1
工事材料 INSTALLATION MATERIALS		**CP16-04401**	
ケミシール SILICON RUBBER		S-8400W アルミチューブ50G 000-158-483-10	1
ゴム板 RUBBER MAT		M02219* 999-999-146-00	1 (*)
放射警報ステッカー RADIATION WARNING STICKER		L05-10040 999-999-144-00	1 (*)
六角ボルト HEX BOLT		M10X60 SUS M90-10242 999-999-148-00	4 (*)
六角ナット HEX NUT		M10 SUS M90-10082 999-999-151-00	8 (*)
平座金 PLAIN WASHER		M10 SUS M90-10083 999-999-149-00	8 (*)
バネ座金 SPRING WASHER		M10 SUS M90-10217 999-999-150-00	8 (*)
シールワッシャー SEAL WASHER		M90-10244 999-999-147-00	4 (*)

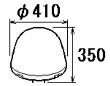
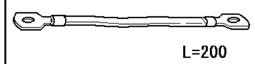
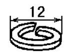
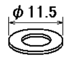
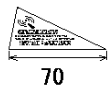
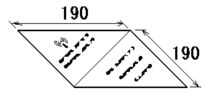
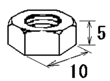
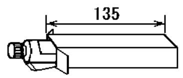
(*)は、ダミーコードに付き、注文できません。
(*) THIS CODE CANNOT BE ORDERED.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

FB-1250

A-6

N A M E	O U T L I N E	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
アンテナユニット ANTENNA UNIT		FB-1250 000-016-487-00	1
工事材料 INSTALLATION MATERIALS		**CP16-04501**	
アース線 GROUND CABLE		999-999-152-00	1 (*)
バネ座金 SPRING WASHER		M6 SUS304 999-999-154-00	6 (*)
平座金 PLAIN WASHER		M6 SUS304 999-999-153-00	6 (*)
放射警報ステッカー(小) REDIATION WARNING STICKER		999-999-156-00	2 (*)
放射警報ステッカー(大) REDIATION WARNING STICKER		999-999-157-00	1 (*)
六角ナット HEX NUT		M6 SUS304 999-999-155-00	12 (*)
ケミシール SILICON RUBBER		S-8400W アルミチューブ50G 000-158-483-10	1

(*)は、ダミーコードに付き、注文できません。
(*) THIS CODE CANNOT BE ORDERED.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

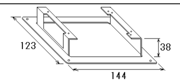
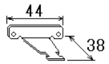
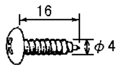
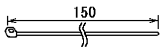
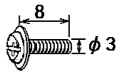
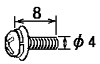
FURUNO

CODE NO.	001-067-360-00	16AQ-X-9401 -1
TYPE	CP16-04001	1/1

工事材料表
INSTALLATION MATERIALS

INMARSAT FLEETBROADBAND

FELCOM500

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾌﾗｯｼｭﾏｳﾝﾄ金具 FLUSH MOUNT PLATE		16-021-4521-1 CODE NO. 100-350-471-10	1	
2	ｹｰﾌﾞﾙ固定金具 CABLE FIXTURE		16-021-4522-0 CODE NO. 100-350-480-10	1	
3	+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ　1ｼｭ SELF-TAPPING SCREW		4X16 SUS304 CODE NO. 000-162-605-10	4	
4	ｺﾝﾍﾞｯｸｽ CABLE TIE		CV-150N CODE NO. 000-162-186-10	1	
5	+ﾊﾞｲﾝﾄﾞｾﾑｽF BINDER HEAD SCREW-F		M3X8 C2700W MBCR2 CODE NO. 000-163-538-10	2	
6	+ﾅﾍﾞｾﾑｽB WASHER HEAD SCREW *B*		M4X8 SUS304 CODE NO. 000-163-863-10	4	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO., LTD.　　16AQ-X-9401

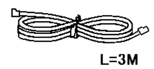
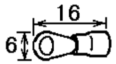
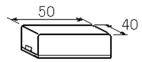
FURUNO

CODE NO.	000-043-228-00	16AF-X-9416 -2
TYPE	OP16-13	1/1

明細書
DESCRIPTION

ﾓｼﾞｭﾗｰｺｰﾄﾞ

FELCOM30/50/70/500

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ﾓｼﾞｭﾗｰｺｰﾄﾞ MODULER CORD		BCM23 IV BCM23 IV CODE NO. 000-170-701-10 000-138-773-00	1	
2	圧着端子 CRIMP-ON LUG		FV1.25-3(LF) CODE NO. 000-166-756-10	2	
3	ﾛｰｾﾞｯﾄ MODULAR JACK BOX		MJ-2S *GR* CODE NO. 000-165-995-10	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

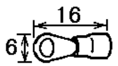
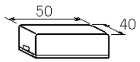
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO., LTD.　　16AF-X-9416

FURUNO

CODE NO.	000-043-272-00	16AQ-X-9407 -0
TYPE	OP16-8	1/1

明細書 DESCRIPTION	INMARSAT FLEETBROADBAND FELCOM500 Modular jack box	

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	圧着端子 CRIMP-ON LUG		FV1.25-3(LF) CODE NO. 000-166-756-10	2	
2	ﾛｰｾﾞｯﾄ MODULAR JACK BOX		MJ-2S *GR* CODE NO. 000-165-995-10	1	

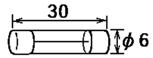
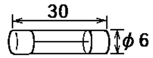
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO., LTD. 16AQ-X-9407

FURUNO

CODE NO.	001-067-320-00	16AQ-X-9301 -0 1/1
TYPE	SP16-01901	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL
	FELCOM500		

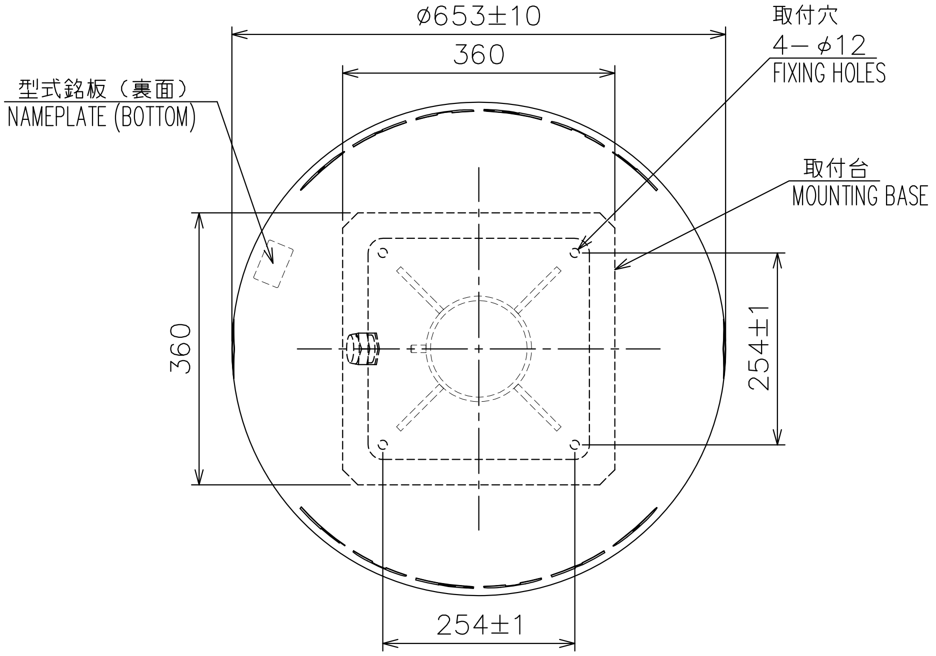
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	PER VES	SPARE	REMARKS/CODE NO.
1	ﾋｭｰｽﾞ GLASS TUBE FUSE		FGBO 125V 7A PBF			2	000-155-831-10
2	ﾋｭｰｽﾞ GLASS TUBE FUSE		FGBO 125V 15A PBF			1	000-155-827-10

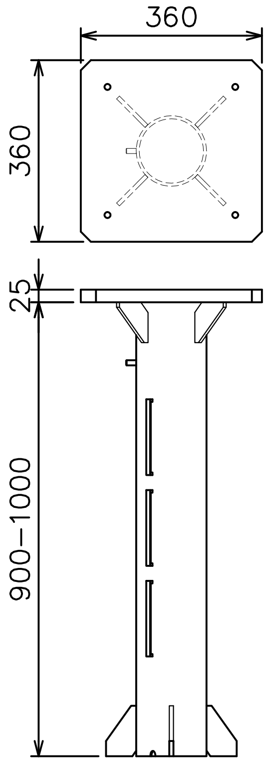
MFR'S NAME	FURUNO ELECTRIC CO., LTD.	DWG NO.	16AQ-X-9301	1/1

（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）
型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

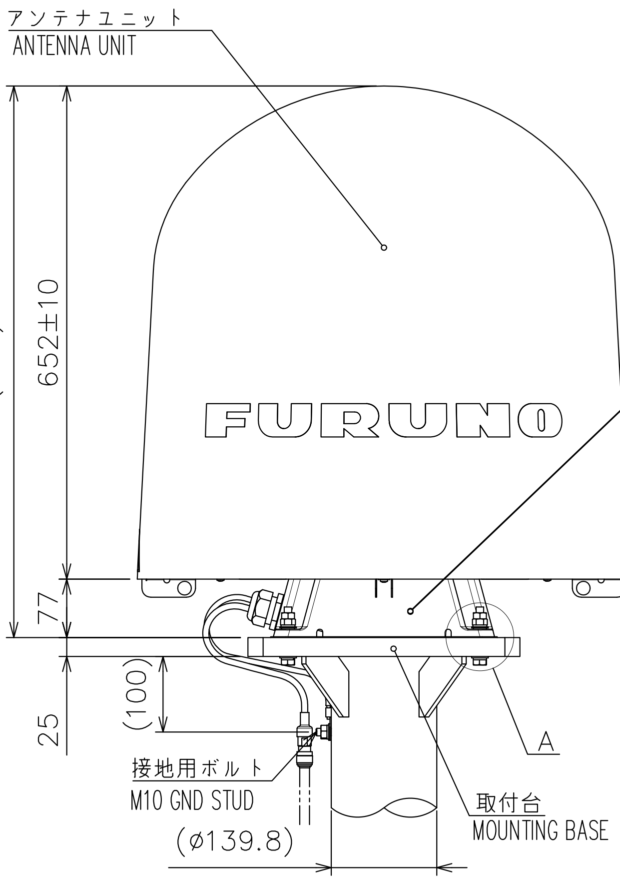
表1 TABLE 1

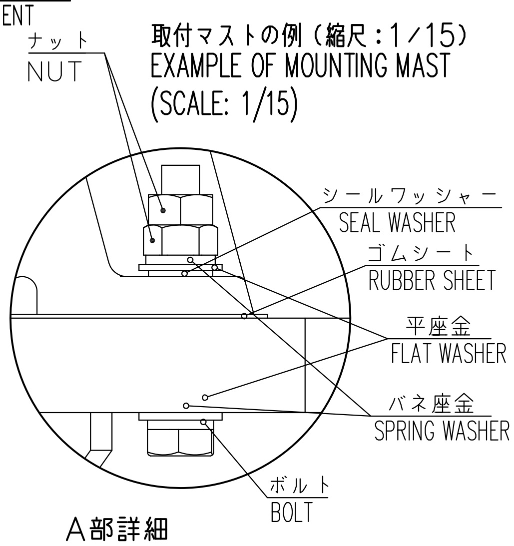
寸法区分（mm）DIMENSION	公差（mm）TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4





取付マストの例（縮尺：1／15）
EXAMPLE OF MOUNTING MAST
(SCALE: 1/15)





A部詳細
DETAIL OF A

注　記　1）指定外の寸法公差は表1による。
　　　　2）取付用ネジはM10ボルトを使用のこと。

NOTE　1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　2. USE M10 BOLTS FOR FIXING THE UNIT.

DRAWN 4/Feb/10 T.YAMASAKI		TITLE	FB-1500-A
CHECKED 4/Feb/10 T.TAKENO		名称	アンテナユニット（アタッチメント付）
APPROVED 8/Mar/10 R.Esumi	FELCOM 500		外寸図
SCALE 1/10	MASS 21 ±10% kg	NAME	ANTENNA UNIT (W/ ATTACHMENT)
DWG. No. C5666-G03- D	REF. No. 16-021-552G-4		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

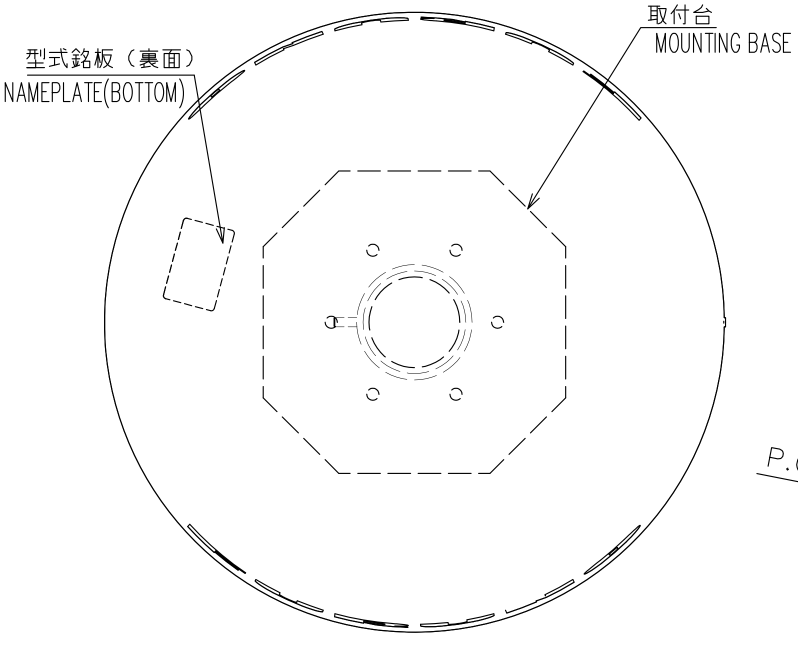
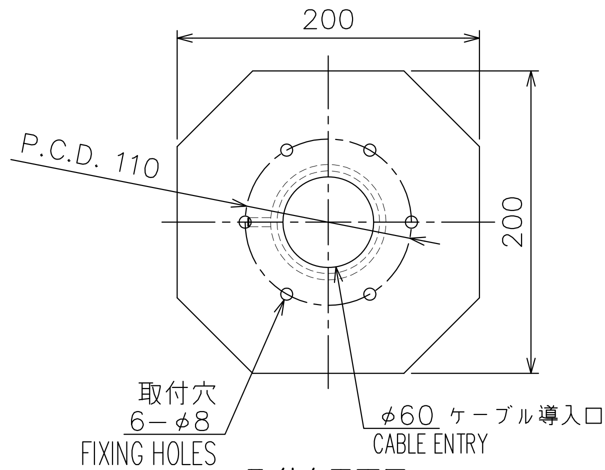
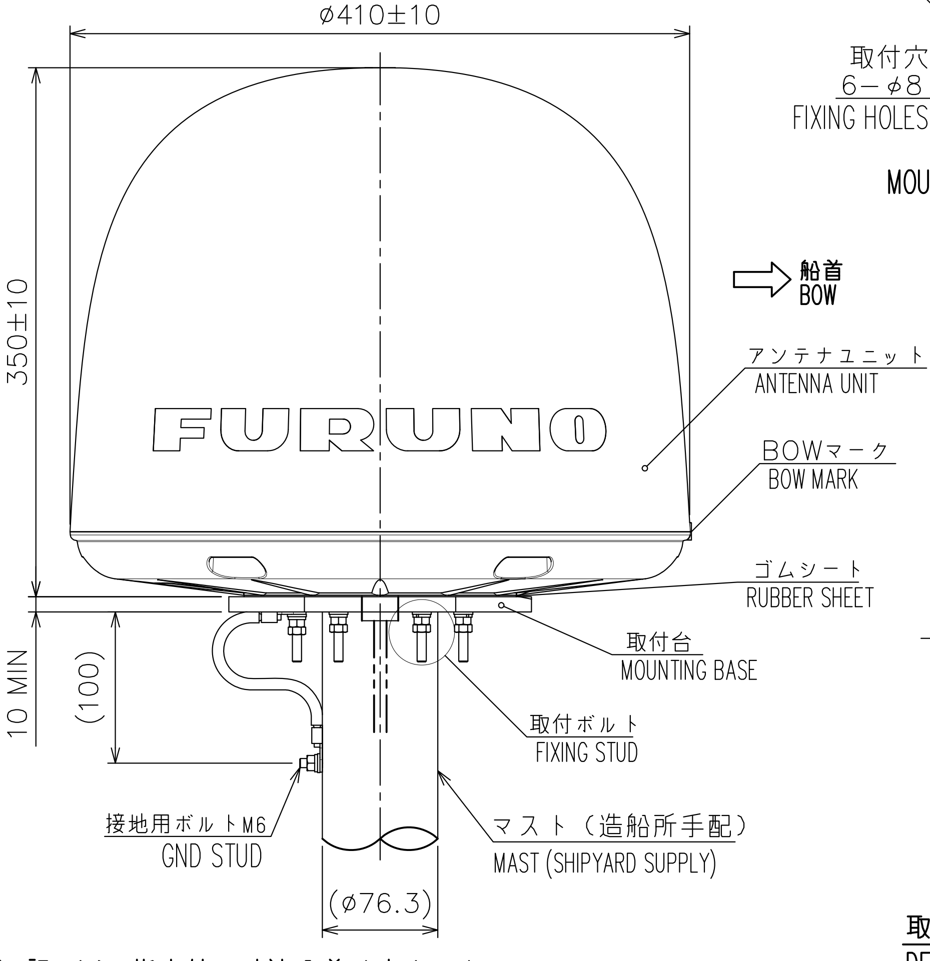


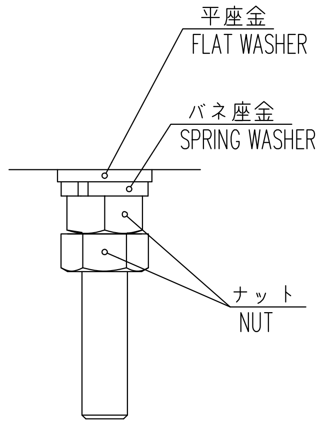
表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3



取付台平面図
MOUNTING BASE DIMENSIONS





取付部詳細（尺度：1/1）
DETAIL FOR FIXING (SCALE:1/1)

注 記 1） 指定外の寸法公差は表1による。
2） ケーブルはマスト内を通る。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. ANTENNA CABLE RUNS INNER MAST.

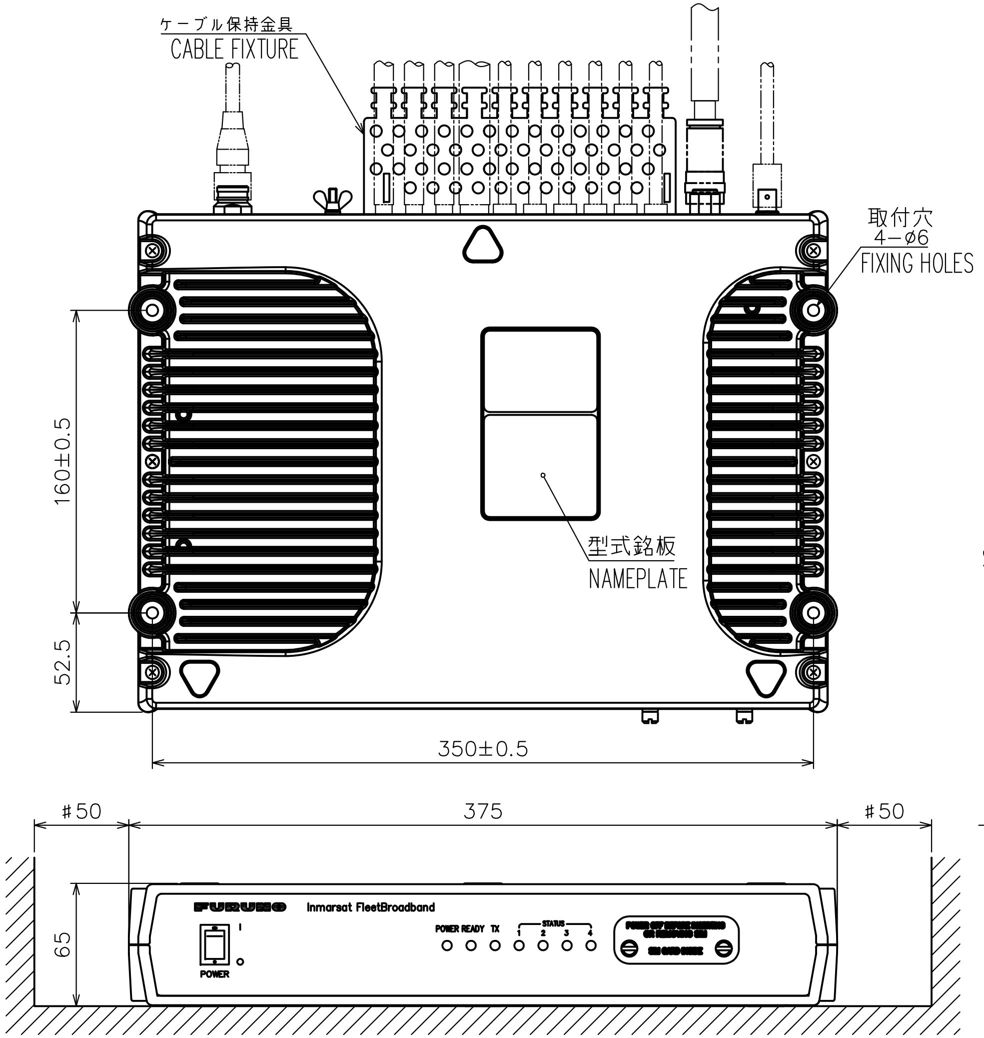
DRAWN 28/Nov/09 T.YAMASAKI		TITLE FB-1250
CHECKED 30/Nov/09 T.TAKENO		名称 アンテナユニット
APPROVED 11/Dec/09 R.Esumi	FELCOM 250	外寸図
SCALE 1/5 MASS 6.5 ±10% kg		NAME ANTENNA UNIT
DWG. No. C5667-G01- A	REF. No. 16-021-650G-2	OUTLINE DRAWING

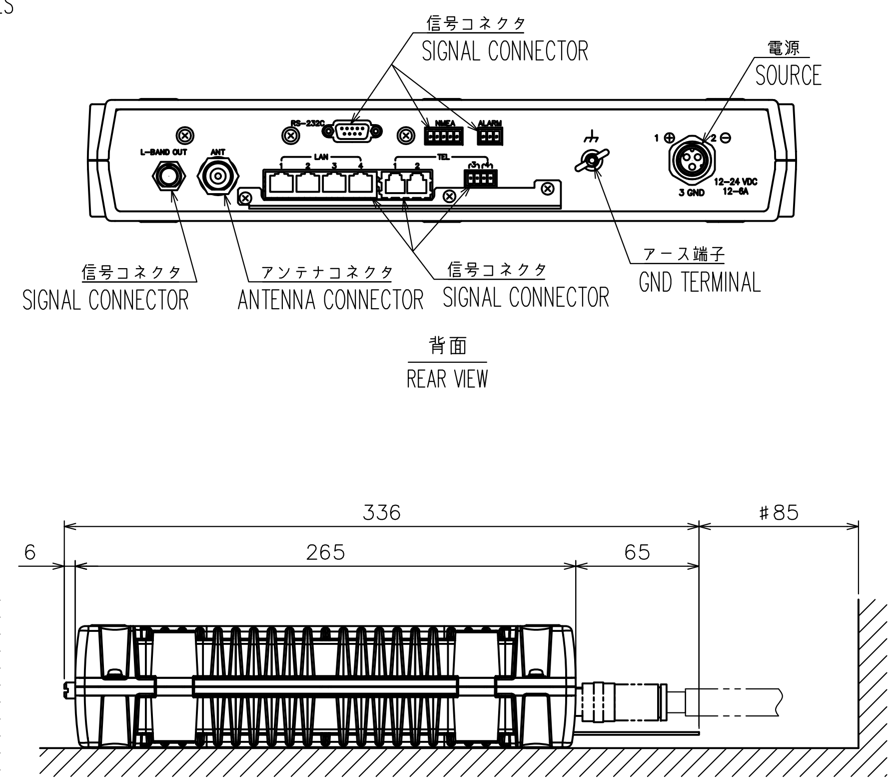
FURUNO ELECTRIC CO., LTD.

FURUNO

表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3





注　記　1）＃印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表１による。
3）取付には＋トラスタッピンネジ呼び径５×５０を使用のこと。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M5 BOLTS OR TAPPING SCREWS ø5x50 FOR FIXING THE UNIT.

DRAWN	11/May/2010 T.YAMASAKI	TITLE	FB-2000 (IP20)
CHECKED	11/May/2010 T.TAKAHASHI	名称	通信制御ユニット（壁掛・卓上装備）
APPROVED	17/May/2010 TAKAHASHI	FELCOM 500/250	外寸図
SCALE 1/4	MASS 4.1 ±10% kg	NAME	COMMUNICATION UNIT (BULKHEAD/TABLETOP MOUNT)
DWG.No. C5666-G01- C	REF.No. 16-021-250G-3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

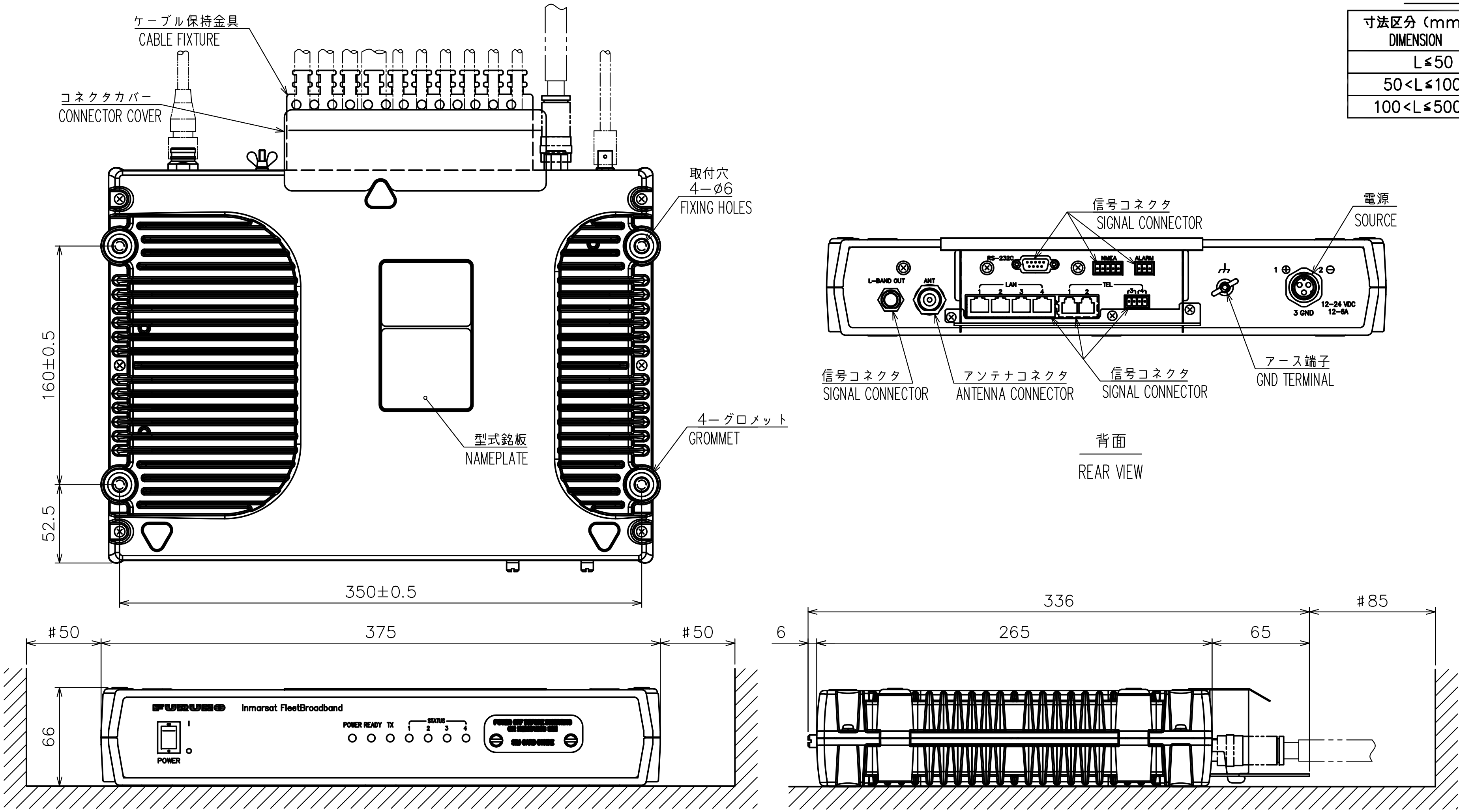


表 1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注 記
1） 指定外の寸法公差は表1による。
2） #印寸法は最小サービス空間寸法とする。
3） 取付には+トラスタッピンネジ呼び径5×50を使用のこと。

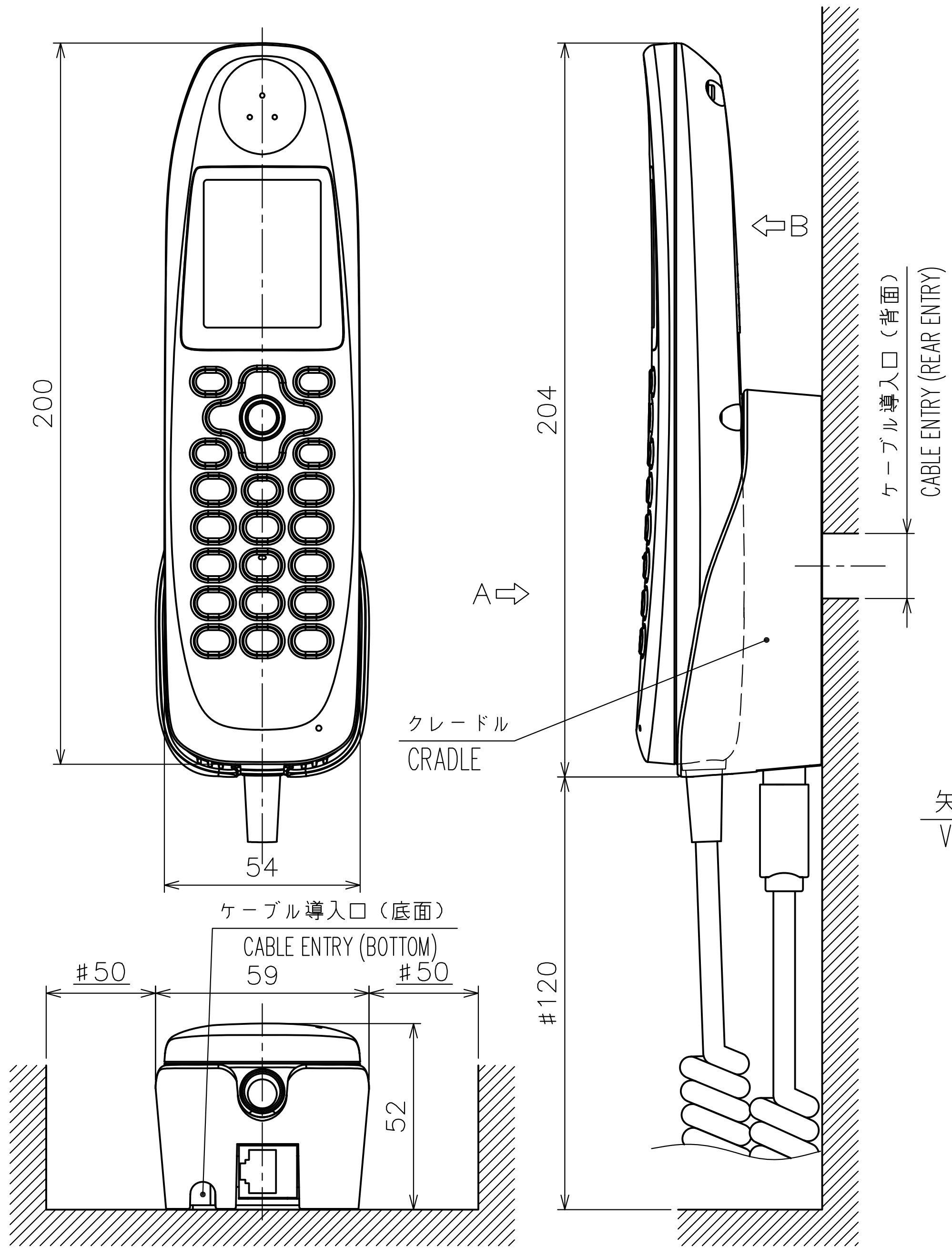
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS ø5x50 FOR FIXING THE UNIT.

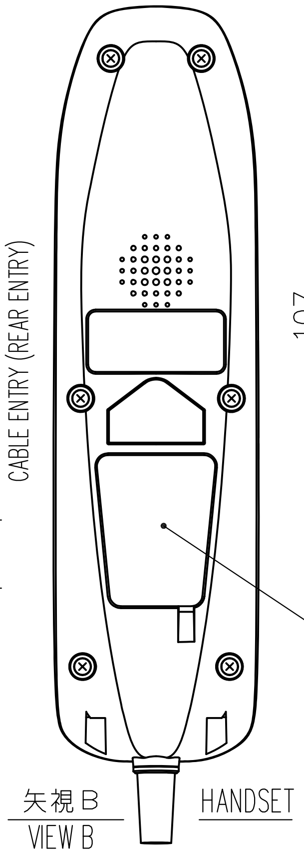
DRAWN 11/May/2010 T.YAMASAKI		TITLE	FB-2000 (IP22)
CHECKED 11/May/2010 T.TAKAHASHI		名称	通信制御ユニット（卓上装備）
APPROVED 17/May/2010 TAKAHASHI	FELCOM 500/250		外寸図
SCALE 1/4 MASS 4.2 ±10% kg		NAME	COMMUNICATION UNIT (TABLETOP MOUNT)
DWG.No. C5666-G08- A	REF.No. 16-021-251G-0		OUTLINE DRAWING

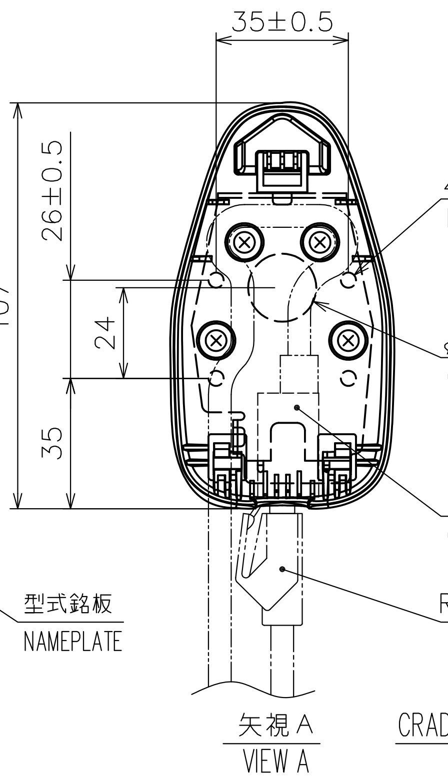
FURUNO ELECTRIC CO., LTD.

表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3







注　記　1）　#印寸法は最小サービス空間寸法とする。

2）　指定外の寸法公差は表１による。

3）　取付用ネジはトラスタッピンネジ呼び径３×１０を使用のこと。

NOTE　1.　#: MINIMUM SERVICE CLEARANCE.

2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

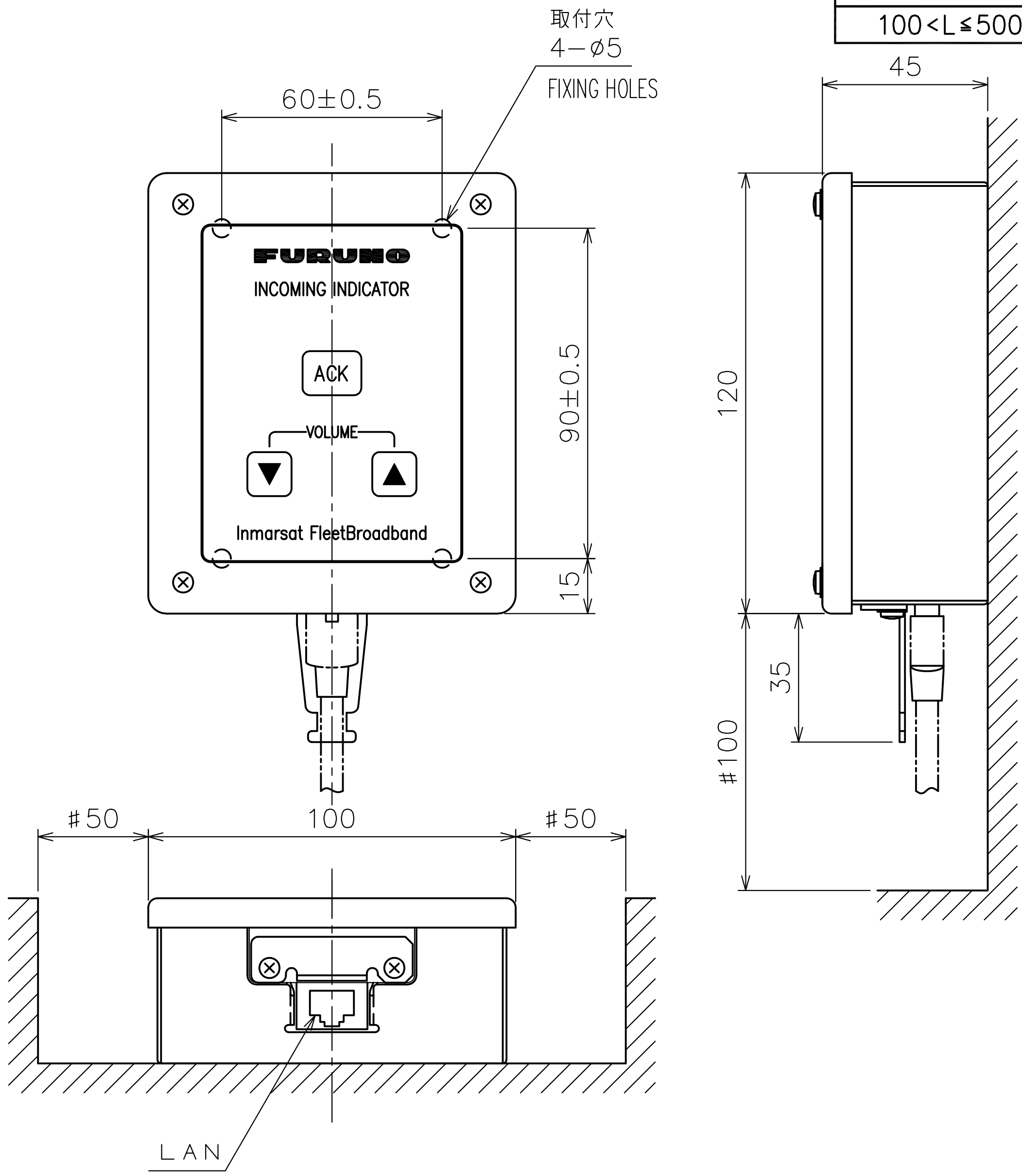
3.　USE TAPPING SCREWS ø3x10 FOR FIXING THE UNIT.

DRAWN 20/Apr/09 T.YAMASAKI		TITLE	FB−8000
CHECKED 20/Apr/09 T.TAKENO		名称	ハンドセット（クレードル）
APPROVED 11/May/09 R.Esumi	FELCOM 500/250		外寸図
SCALE 1/2	MASS 0.42 ±10% kg	NAME	HANDSET (CRADLE)
DWG.No. C5666-G04- B	REF.No. 16-021-350G-2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3



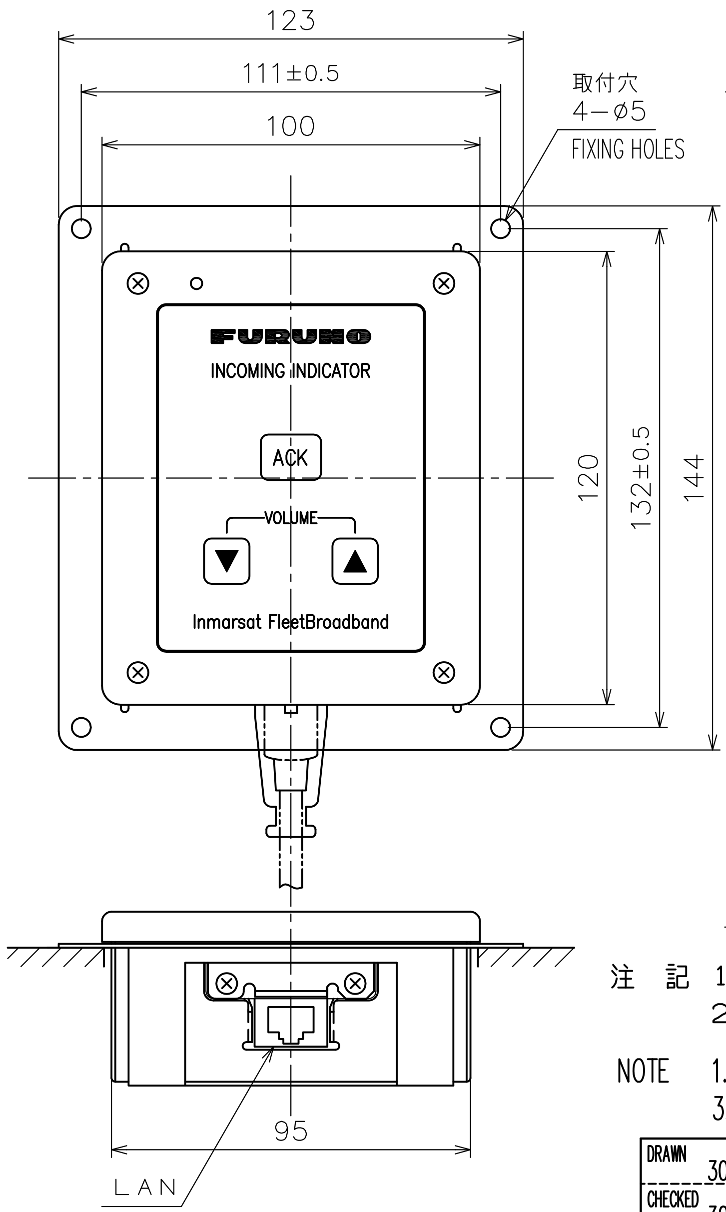
注　記
1） 指定外の寸法公差は表１による。
2） ＃印寸法は最小サービス空間寸法とする。
3） 取付用ネジは、＋トラスタッピンネジ呼び径４×１６を使用のこと。

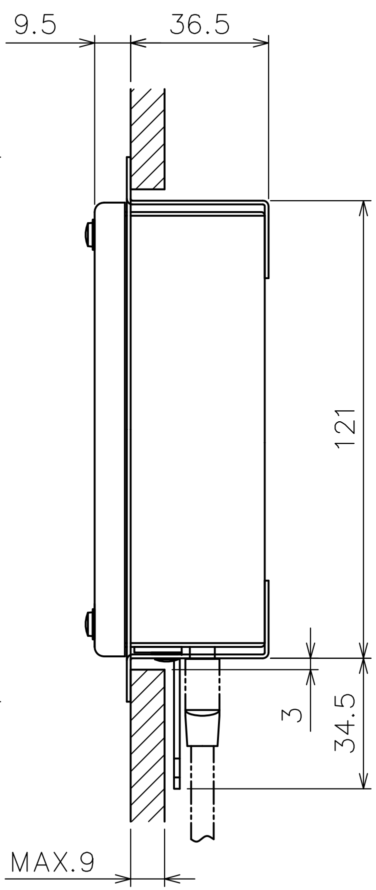
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS ø4x16 FOR FIXING THE UNIT.

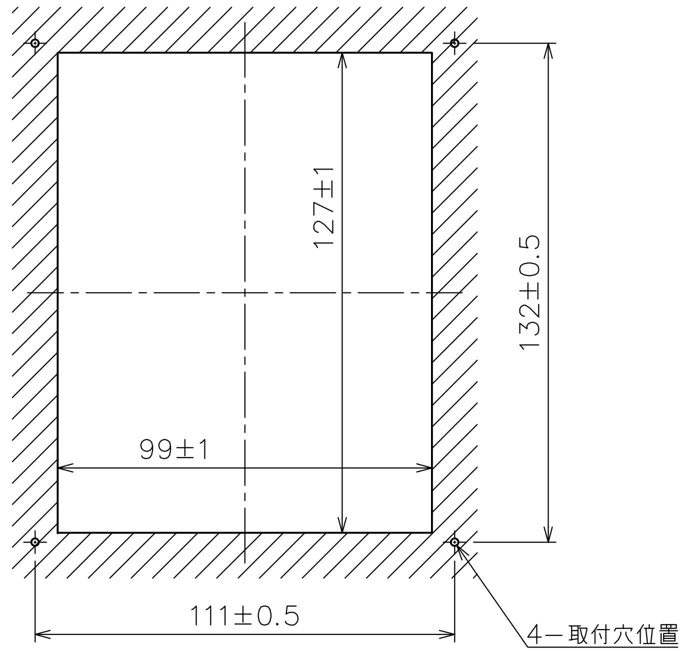
DRAWN 30/Jan/09 T.YAMASAKI		TITLE	FB-3000
CHECKED 30/Jan/09 T.TAKENO		名称	着信指示器（壁掛装備）
APPROVED 18/Feb/09 R.Esumi	FELCOM 500/250		外寸図
SCALE 1/2 MASS 0.37 ±10% kg		NAME	INCOMING INDICATOR (BULKHEAD MOUNT)
DWG. No. C5666-G05- A	REF. No. 16-021-450G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO







取付穴寸法図
CUTOUT DIMENSIONS

表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注 記 1）指定外の寸法公差は表１による。
2）取付用ネジは、＋トラスタッピンネジ呼び径４×１６を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE TAPPING SCREWS ø4x16 FOR FIXING THE UNIT.

DRAWN 30/Jan/09 T.YAMASAKI		TITLE	FB−3000
CHECKED 30/Jan/09 T.TAKENO		名称	着信指示器（埋込装備）
APPROVED 18/Feb/09 R.Esumi	FELCOM 500/250		外寸図
SCALE 1/2	MASS 0.46 ±10% kg	NAME	INCOMING INDICATOR (FLUSH MOUNT)
DWG. No. C5666-G06- A	REF. No. 16-021-451G-2		OUTLINE DRAWING

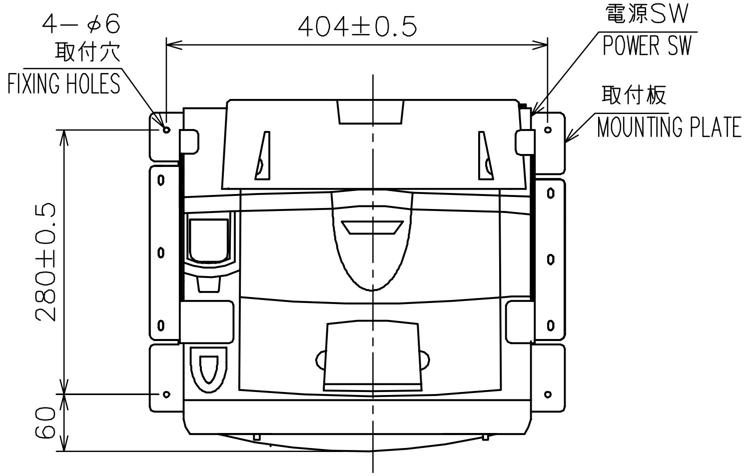
FURUNO ELECTRIC CO., LTD.

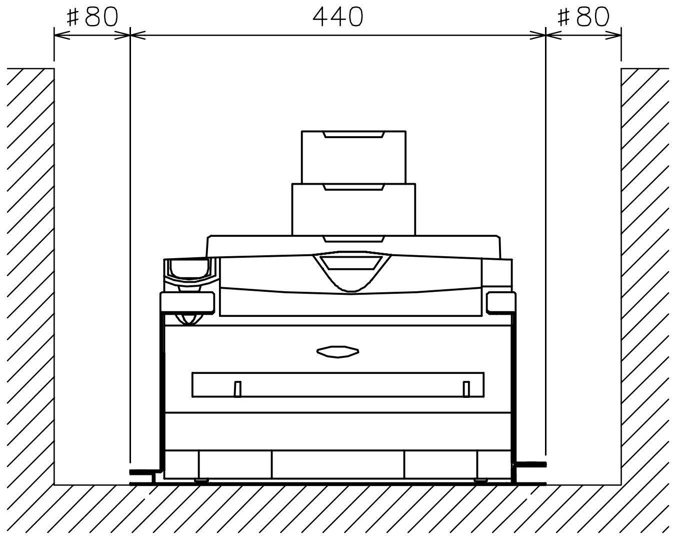
表 1 TABLE 1

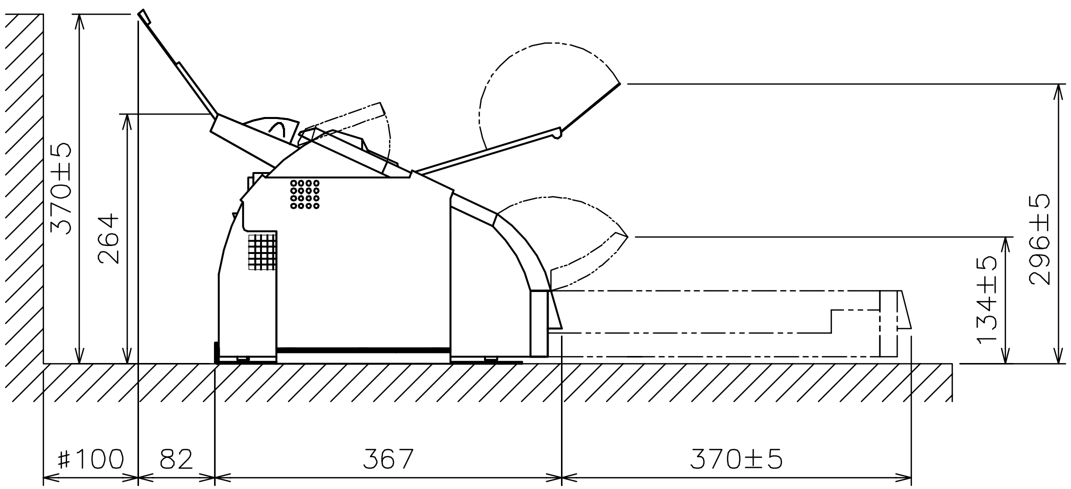
寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注 記 1） ＃印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表１による。
3） 取付用ネジはトラスタッピンネジ呼び径5×20を使用のこと。

NOTE 1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.





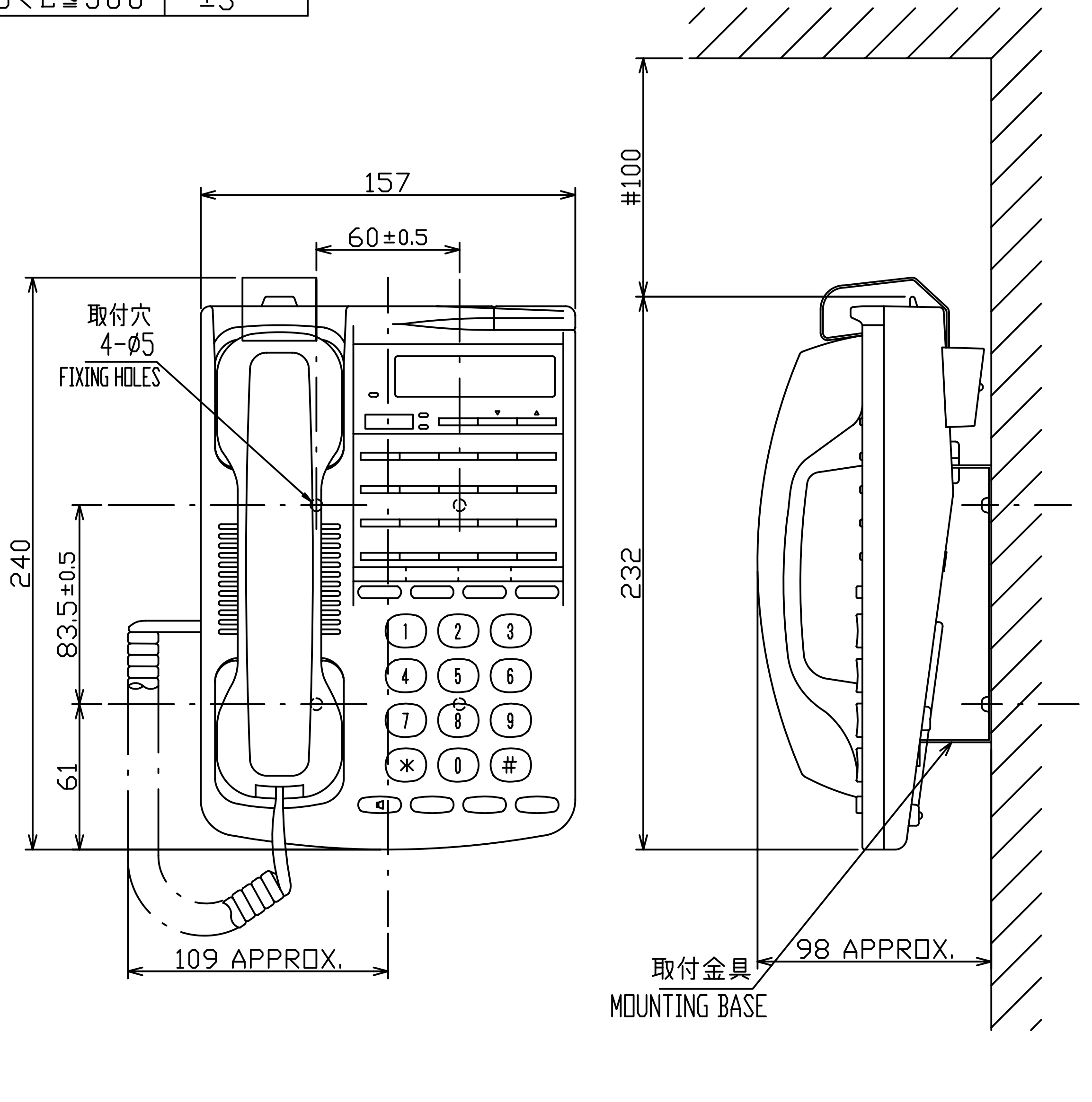


DRAWN Sep. 21, '05 E. MIYOSHI		TITLE	FAX-2810
CHECKED TAKAHASHI.T		名称	ファクシミリ(和文)
APPROVED Y. Hatai	FELCOM 82/70/50/30		外寸図
SCALE 1/8 MASS 12.0 ±10% kg	質量は取付板を含む。 MASS INCLUDES MOUNTING PLATE.	NAME	FACSIMILE (JAPANESE)
DWG No. C5624-G18- B	16-011-410G-1		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

表 1　TABLE 1

寸法範囲（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3



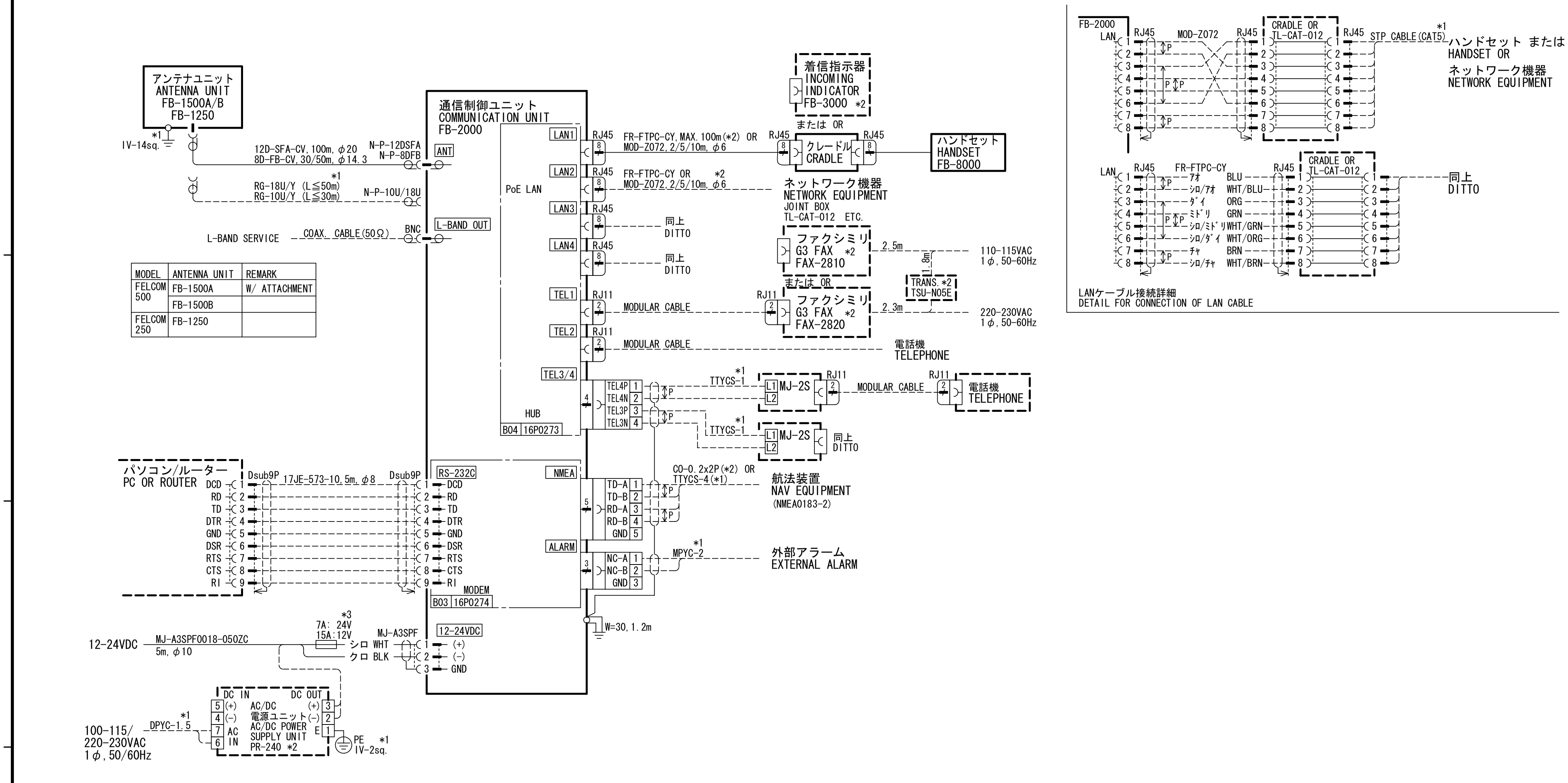
注 記
1）指定外の寸法公差は表1による。
2）#：最小サービス空間寸法。
3）取付にはトラスタッピンネジ4x16 SUS304を使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS 4x16 SUS304 FOR FIXING THE UNIT.

DRAWN	Feb. 9 '06	T.YAMASAKI	TYPE	FC755D1
CHECKED	Feb. 9 '06	T.TAKENO	名称	電話機（壁掛装備）
APPROVED	Feb.15'06	T.Matsuguchi	FELCOM 81/82/70	外寸図
SCALE 1/3	MASS 0.83 kg ±10%		NAME	TELEPHONE (BULKHEAD MOUNT)
DWG.No.	C5589-G19- D	16-011-710G- 0		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



MODEL	ANTENNA UNIT	REMARK
FELCOM 500	FB-1500A	W/ ATTACHMENT
	FB-1500B	
FELCOM 250	FB-1250	

CO-0.2x1P: CO-SPEVV-SB-C 0.2x1P, φ8.5
CO-0.2x2P: CO-SPEVV-SB-C 0.2x2P, φ10.5

注記
＊1）造船所手配。
＊2）オプション。
＊3）工場出荷時：15A

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: DEFAULT: 15A

DRAWN	7/Jul/2010 T. YAMASAKI	TITLE	FELCOM 500/250
CHECKED	7/Jul/2010 T. TAKAHASHI	名称	インマルサットフリートブロードバンド 相互結線図
APPROVED	3/Aug/2010 Y.NISHIYAMA	NAME	INMARSAT FLEET BROADBAND INTERCONNECTION DIAGRAM
SCALE	MASS kg		
DWG No.	C5666-C01- F	REF. No.	16-021-1001-1

FURUNO ELECTRIC CO., LTD.